THE IRON TRADE REVIEW

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PROSPERITY

PROMISES TO BE CONTINUED INDEFINITELY.

Some Diminution in Buying At Present.—Steel Making Irons Strong.—Heavy Movement of Ore.

Conditions in the iron and steel business continue thoroughly sound, although the buying in some lines shows diminution, as might be expected after the great activity which has prevailed for many months. The crop conditions are favorable, and it is very probable that prosperity will be unbroken for many months.

Very Heavy Ore Movement. The shipments of ore from the Lake Superior ranges for the present month are very heavy, in spite of the loss of ten days on account of the strike. It is understood that the United States Steel Corporation expects to ship 10,000,000 tons from its Mesabi properties alone. Shippers are finding that while the handling facilities at the lower lake docks have been greatly improved in recent years, there is a shortage of cars on the ranges, and the capacity of the upper lake docks is not sufficient to handle the immense tonnage which the mines can produce.

Bessemer and Basic Strong. The market for steel making irons continues to be very strong. During the week a Cleveland interest has sold 10,000 tons of Bessemer for third quarter delivery, and a number of sales of basic have been made. The Corporation has purchased all Bessemer obtainable. The demand for foundry grades is not so strong as that for basic and Bessemer, and sales are freely made at $16 to $16.25 valley for No. 2 foundry. In the east some large sales have been made; in New York a fair tonnage has been disposed of and in the south one lot of 5,000 tons and several of 1,000 tons each have been purchased, but reports of sales are not numerous. An inquiry for 10,000 tons by an Ohio pipe interest has not been placed, because prices were not considered satisfactory. The reports as to stocks of iron on southern furnace yards do not give reason for believing that lower quotations on southern brands will prevail. The price of ferromanganese continues to decline.

Sheet Advance Is Expected. The sheet market is in excellent condition with both new business and specifications heavy, and there is a general belief that an advance from $2 to $4 a ton will be announced shortly. In some cases a premium of $4 per ton has been paid for immediate delivery. The demand for sheets from San Francisco adds strength to the present situation. The call for universal plates is also strong, but sheared plates are not so active. The new quotation on tin plate is being maintained, but sales are not numerous.

Material for Bridges. The principal buyers of structural material are railroads, which are placing orders rather freely for bridges. The general demand for shapes is not so strong, and in some centers there is much less activity. The mills are, however, very busy on old contracts. New tonnage on iron and steel bars is light, and shading of quotations on iron is reported in the east, although in the west the price is well maintained. Prices on wrought iron pipe are somewhat irregular, and in boiler tubes the competition is keen, although business has improved. In cast iron pipe, the only sale of consequence reported is one of 3,500 tons to the city of Chicago.

Rail Sales Continue. Rail sales for 1907 delivery continue of good size and number, contracts closed during the week aggregating about 150,000 tons, in addition to a fair tonnage for 1906 delivery. Manufacturers of track supplies have not named their prices for 1907, and no contracts for spikes, bolts or angle bars are reported. The demand for wire products is exceedingly strong for this time of the year, when a decrease is usually noted.

Scrap Market Still Dull. Some low prices have been made on coke at Chicago to escape demurrage charges. Dealers in old material, who have not been enjoying their share of prosperity for several months, find conditions still very unsatisfactory. Railroads have not been abel to dispose of large tonnages.

HEAVY BUYING OF STEEL.

New York, May 29.—The last two days have converted what promised to be a dull week in the structural steel trade into one of more than average activity. In twenty-four hours the American Bridge Co. booked orders making a total of more than 40,000 tons of steel. Among these is the 30,000-ton tunnel terminal contract which made its appearance late on Saturday, one of 10,000 tons for additions to the Trinity building, Trinity north and Trinity extension; and one for the Normal Latin school building in Boston. There were also orders from the Northwestern railroad for five grade crossing bridges in Chicago, a total of 820 tons. The steel for the Hudson Co. terminal will be supplied by the Pencoyd, the Trenton and the Elmira shops and delivered at the rate of 3,000 to 5,000 tons per week. The contract for the mill at Gary, Ind., has not yet been placed, but it is a safe guess to say that it will be one of the American Bridge Co. jobs, for the mill will undoubtedly be built and the bridge company is one of the United States steel corporation subsidiary companies.

LAKE RAIL SALES.

New York, May 29.—Late rail sales include the following: (for 1907 delivery) Northern Pacific 5,000 additional, making a total of 45,000; C. B. & Q., 25,000; Illinois Central, 40,000; Great Northern, 20,000; Wheeling & Lake Erie, 10,000; Chicago, St. Paul, Minneapolis & Omaha, 10,000; New York, Ontario & Western, 4,000; Tidewater, 27,000; (for 1906 delivery); Wabash, 3,000; Norfolk & Western, 10,000; Boise Interurban, 2,100; Boston Elevated, 1,600; Florida East Coast, 9,000; Cumberland Valley, 2,000; Ft. Smith Lumber Co., 1,600; Northern Electric, 900; scattered lots, 4,000 more.

THE WEEK IN IRON CENTERS.

PITTSBURG.

Bessemer Pig Strong, but Prices on Foundry Grades are Down.

OFFICE OF *The Iron Trade Review*
521 PARK BUILDING, May 30

The only changes noticeable in this market during the week under review have been a slight easing up in some of the finished lines and a marked spread between Bessemer pig iron, which is very scarce and with little chance of improvement before the third quarter, and foundry iron. Bessemer is very strong at prices which have prevailed for several months while foundry quotations have gradually declined. The scarcity of Bessemer pig iron is attributed to the scarcity of Bessemer ore and it is unlikely that the gap between Bessemer and foundry iron will be bridged for a long time to come. There has been a tendency toward weakness in some of the finished lines. Bar iron has not declined in price in this district, but reports from outside indicate weaker conditions.

The spurt in placing rail business for 1907 delivery is taken as an acknowledgement by the western roads that they would have to get in early in order to place their business, while eastern roads will not be in any particular hurry to close, their policy being not to go in this early in the year, although the Pennsylvania lines have already ordered a large tonnage.

There has been some improvement during the past few weeks in plates, the steel car companies having released specifications that have been held up. In light rails there has been considerable demand. Two large interests are entirely out of certain light sections and, on account of the demand upon their mills for other materials, will not go back to them for the remainder of the year.

Pig Iron.—The Cambria Steel Co. during the week bought about 5,000 tons of basic and the corporation picked up what it could of Bessemer for June delivery, the purchase being small in comparison to what the corporation usually takes. An independent pipe interest at Massillon, O., which was in the market for a large tonnage, has decided not to buy at this time. Several of the large foundry interests have admitted that they will be in the market about the middle of June. The uncertainty regarding the molders' strike has had the effect of holding off buying for future requirements.

We quote Besesmer pig iron $17.25 to $17.50 and basic iron $17.00 valley. No. 2 northern foundry is quoted $16.25 valley, although $16.00 could possibly be done on a firm offer of good tonnage. Forge iron is weak and is quoted $16.35 Pittsburg.

Bessemer Valley	$17.25 to 17.50
Bessemer, Pittsburg	18.10 to 18.35
No. 1 Foundry, Pittsburg	17.60 to 17.85
No. 2 Foundry, Pittsburg	17.10 to 17.35
Gray Forge, Pittsburg	16.35
Basic, Valley	17.00 to 17.25
Basic, Pittsburg	17.85 to 18.10

Steel.—Bessemer billets are not nearly as scarce as they were two weeks ago and $26.00 could be done on a good tonnage. Sheet bars continue scarce, but the $28.00 is not being strictly maintained. The only mills of the corporation on sheet bars are at New Castle, Bellaire and Columbus. Mingo is on billets and Youngstown will be on rails for the remainder of the year.

Ferro-Manganese.—The quotations on prompt and future deliveries on ferro-manganese, foreign, 80 per cent. continue to decline and for prompt shipment $75 has been named and for future deliveries quotations of $65 have been made on a good tonnage.

Skelp.—Mills have been out looking for business and but little of it has been found. We quote:

Bessemer grooved, 1.57½c to 1.60c; sheared, 1.65c to 1.70c; basic grooved, 1.60c to 1.65c; sheared, 1.65c to 1.70c; iron skelp, grooved, 1.65c to 1.70c; sheared, 1.80c to 1.85c.

Hoops and Bands.—There has been no change in this market and mills are kept busy on deliveries against old contracts, but new business has been light. Prices are unchanged, as follows:

Hoops, 1.90c in carload lots, and 2c on less than carload lots, bands, 1.50c base, half extras as per standard steel card. Prices f. o. b. Pittsburg.

Cotton Ties.—This market has been practically dead for some time. The June advance, effective the first of the month, will make the price 86c per bundle.

Muck Bar.—There have been no inquiries or sales upon which to base a quotation.

Rails and Track Material.—The past week, as far as local mills are concerned, has been dull in new business. The Carnegie Steel Co. still has considerable capacity for 1906. It is estimated that northern rail mills for 1906 have contracts for 3,000,000 tons and southern mills for 1,000,000 tons, making a total of 4,000,000 tons for the current year. Over 1,000,000 tons has been placed for 1907 delivery. The Northern Electric Ry. Co., of San Francisco, has increased its contract from 11,000 tons to 20,000, of which 6,000 is for 1907 delivery. Part of the order is for low carbon rails for a third rail system. The demand for railroad spikes has been very heavy. We quote:

Fifty pounds and heavier, 500-ton lots and over, $28; carloads and less than 500 tons, $30; less than carload lots, $32; light rails, 16 pounds $30, 20 pounds, $28.50; 25 to 45 pounds, $28.50; angle bars for standard sections, 1.50c; spikes, $2.05 to $2.10.

Structural Material.—The specifications against existing contracts have been very heavy, but as far as strictly new business is concerned business has been light, although the various construction companies have taken several contracts, none of very large tonnages. We quote:

Beams and channels, 15 in. and under, 1.70c; over 15 in., 1.80c; zees, 1.70c; tees, 1.75c; angles from three to six inches, inclusive, 1.70c; over six inches, 1.80c; universal and sheared plates, 6¼ inches and wider, 1.60c base.

Plates.—The contract for riveted plate pipe for the municipality of Brooklyn has been let and the plain material, which will aggregate 12,000 to 14,000 tons, will be rolled by the Carnegie Steel Co. Deliveries have greatly improved on both sheared and universal plates and shipments can now be made on the former within two weeks and on universal plates within a month or six weeks. We quote:

Tank plate ¼ inch thick, 6¼ to 100 inches, 1.60c f. o. b. mill, Pittsburg. Extras are as follows per 100 pounds, boiler and flange steel plates, 0.10c; A. B. M. A. and ordinary firebox steel plates, 0.20c; still bottom steel, 0.30c; marine steel, 0.40c; locomotive firebox steel, 0.50c; all sketches excepting straight taper plates, varying not more than four inches in width at ends, narrowest end not being less than 30 inches, 0.10c; complete circles, 0.20c. Plates in width over 100 inches up to 110 inches, 0.05c; over 110 inches up to 115 inches, 0.10c; over 115 inches up to 120 inches, 0.15c; over 120 inches up to 125 inches, 0.25c; over 125 inches, up to 130 inches, 0.50c; over 130 inches, 1.00c. Gauges under ¼ inch to and including 3-16 inch plates on thin edges, 0.10c; under 3-16 inch to and including No. 8, 0.15c; under No. 8 and including No. 9, 0.25c. Five cents extra for less than carloads. Terms net cash in 30 days.

Sheets.—The sheet market has been good, not that the new business has been particularly heavy, but it has been steady and in fair volume. The specifications against old contracts have been very good, and the leading interest is much behind on its deliveries, due to a great extent to the closing down of many of its mills on account of a shortage of semi-finished material, which condition has not improved and is not likely to for some little time to come. We quote:

Black steel sheets, box annealed, cold rolled, one pass: Nos. 11-12, 2c; Nos. 13-14, 2.05c; Nos. 15-16, 2.10c; Nos. 17-21, 2.15c; Nos. 22-24, 2.20c; Nos. 25-26, 2.25c; No. 27, 2.30c; No. 28, 2.40c. Galvanized, Nos. 10-11, 2.35c; Nos. 12-14, 2.45c; Nos. 15-16, 2.55c; Nos. 17-21, 2.70c; Nos. 22-24, 2.85c; Nos. 25-26, 3.05c; No. 27, 3.25c; No. 28, 3.45c. Corrugated roofing, $1.70 per square for No. 28 painted, 2½-inch corrugation; $3.05 per square for No. 28 galvanized, 2½-inch corrugation. Quotations f. o. b. Pittsburg on large lots.

Tin Plate.—The new official price of $3.75 per bar with the usual five-cent discount is being firmly maintained by all interests and some little business has been taken at this figure, but mostly by independent producers, as the leading interest has on its books at the present time tonnage to keep it going for practically the limit to which it will contract ahead.

We quote: $3.75 per base box, f. o. b. Pittsburg, 14 x 20 100-pound cokes, terms 30 days, less two per cent off for cash in ten days.

Merchant Bars.—The market as far as new business in bar iron is concerned has been very quiet and but little business has been done. Although it has been reported from the western territory that mills in this district have been selling below $1.50 Pittsburg, the report is not credited. We quote:

Common iron bars, 1.55c, Pittsburg, in carload lots, 1.60c in less than carloads; for western shipment 1.50c base Pittsburg; Bessemer steel bars, 1.50c; plow and cultivator, 1.50c net; channels, angles, zees and tees, under three inches, 1.60c, all f. o. b. Pittsburg. The following differentials are maintained on steel: Less than 2,000 pounds, 0.10c advance; less than 1,000 pounds, of a size, 0.30c advance.

Merchant Steel.—The market is firm and the specifications are heavy, but new business has been light. The action of the bar association in reaffirming old prices and standing out against any concessions whatever, has strengthened the situation. We quote:

Cold rolled and ground shafting, 50 per cent off in carload lots, and 45 off in less than carloads, delivered in base territory; tire steel, 1.70c to 1.80c; open-hearth spring steel, 2.25c to 2.50c; sleigh shoe flat, 1.50c to 1.55c; smooth finished machinery steel, 1.90c to 2c; toe calk, 2.05c to 2.10c. The price of planished and machine straightened tire is 1.70c base half extras as below. Iron finished tire up to 1½ inch by ½ inch, 1.65c base half extra tire list. Iron finished tire 1½ inch by ½ inch and over to be sold on regular bar basis of 1.50c base; half extra steel card.

Merchant Pipe.—On steel merchant pipe the prices remain as they have been for the past six months and, if anything, are firmer, and as far as can be learned there has been no shading, but on iron pipe the prices have not been uniform and are not strong. The fact that the National Tube Co., as announced last week, is prepared to supply black wrought pipe, merchant card and extra strong weights, plain ends or threaded, sizes one inch to three inches, in lengths up to forty feet, has attracted considerable attention in the lines where these extra lengths are available, this length being very much out of the ordinary, the usual length being from 19 to 22 feet and special furnaces and appliances have been installed to turn it out.

We quote the official discounts on pipe, consumers' carloads, with jobbers' carloads one point higher:

	Steel		Iron	
Consumer's Carloads	Black	Galv.	Black	Galv.
⅛ and ¼ inch	71	55	67½	51½
⅜ inch	73	59	69½	55½
½ inch	75	63	71½	59½
¾ to 6 inches	79	69	76	66
7 to 12 inches	74	59	71	55½
EXTRA STRONG PLAIN ENDS.				
⅛ to ⅜ inch	64	52	60½	48½
½ to 4 inches	71	59	67½	55½
4½ to 8 inches	67	55	63½	51½
Double extra strong plain ends, ⅛ to 8 inches	60	49	56½	45½

Boiler Tubes.—The increase in business on account of the low prices made has been decided within the past three weeks. The demand for locomotive boiler tubes still continues very good and prices are firm. On merchant boiler tubes we quote as follows:

	Steel	Iron
1 to 1¾ inches	50	45
1¾ to 2¼ inches	62	45
2¼ inches	64	50
2¾ to 5 inches	70	57
6 to 13 inches	62	45

Less than carload lots two points less.
2½ inches and smaller, over 18 feet, 10 per cent net extra.
2¾ inches and larger, over 22 feet, 10 per cent net extra.

Wire and Wire Nails.—With the approach of July 1, when the mills close down for necessary repairs during the dull period of the year, the new business is light, but the demand for deliveries on specifications against old contracts continues good. Conditions up to this time have been unusually good for the season and there has been no necessity to date of making price inducements to get all the business wanted. Before closing down, the mills will make their customary stocks to tide them through the summer months. We quote:

Wire nails, jobbers' carload lots, $1.85; retailers' carload lots, $1.90, and less than carload lots, $2; painted barb wire, $2 for jobbers in carloads; retailers in carloads, $2.05, and less than carloads, $2.15, with 30c for galvanizing, plain wire $1.70 to jobbers and $1.75 by carload.

Old Material.—The scrap market has not shown any decided tendency one way or the other, although in some instances there have been a few transactions, mostly of the hand to mouth order. One large producer of scrap, but not a large consumer, has been selling on the weak market and this has had the effect of keeping it very weak and the scarcity of pig iron has not been noticeably felt. We quote: Heavy melting stock, $15; No. 1 cast scrap, $15 to $15.50; cast borings, $8.50 to $9; bundled sheet scrap $13.50; No. 1 railroad wrought, $17; low phosphorus scrap, $18 to $18.50; wrought turnings, $11 to $11.50; bushcling scrap, $14 to $14.50; iron axles, $25.50 to $26; old steel rails, rerollers, $15.50 to $15.75.

Coke.—The Sharpsville Furnace Co., recently taken over by new interests has closed for its furnace coke for the next six months at the rate of 5,000 tons per month, but the price was not made public. The uncertainty of the foundry situation on account of the molders' strike has been felt in the coke market. On account of the Memorial Day holiday the ovens in the coke regions will not be operated and a slight scarcity may be anticipated during the latter part of the week, as the celebrations usually retard operations for a day or two. We quote strictly standard Connellsville furnace coke $2.40 to $2.60 and foundry coke $2.65 to $2.80, ovens. There are a number of new plants under construction in the Connellsville regions and many of them will be fired before fall. The estimated production of the Connellsville region for the week ending May 19 was 272,492 tons and for the lower Connellsville region 102,489.

Losses aggregating $250,000 were occasioned by fire May 26 when the plant of Hucker, Levette & Loeb, Twenty-fifth street, New York, manufacturing plating, polishing and grinding materials, was destroyed. The top floor of the building was occupied by the Connecticut Dynamo & Motor Co.

CHICAGO.

Large Tonnage of Pig Iron Under Negotiation—Southern Stocks Low.

Office of *The Iron Trade Review*, }
1262 Monadnock Block, May 30 }

It has been an uneventful week in iron and steel. No material changes have developed in any product and the market is resting easy. The principal sales involved structural steel, 6,000 tons being taken by western railroads for new bridges and shops. Sheets are very active, and early deliveries of galvanized and corrugated are hard to obtain. There is a brisk movement of these products in San Francisco, the shipments of the American Sheet & Tin Plate Co. since the earthquake amounting to nearly 20,000 tons. Cast iron pipe leads in activity in tubular goods, the United States Cast Iron Pipe & Foundry Co. having taken a contract for 3,500 tons from the City of Chicago in the past week. Merchant pipe and boiler tubes are experiencing a little softness in values, but are moving freely. The feature of pig iron market is the expressed willingness of large melters to contract for the last half if satisfactory prices can be secured. Among these is the International Harvester Co which states a willingness to consider $12 Birmingham on 25,000 tons. Transactions in the week under review have been comparatively light, foundrymen buying largely for current requirements. Scrap continues apathetic, the large offerings of railroads and the accumulations in the hands of dealers and consumers balking the efforts to maintain a strong market. Coke is also weak, demurrage fuel being plentiful.

Pig Iron.—The general tone of the market is about the same as it has been for two weeks past or more. On the surface prices seem stronger, but the easier undercurrent is still noticeable. Southern iron is quoted from $13.75 to $14 Birmingham for No. 2 foundry, and northern No. 2 at $18.30 to $18.50, Chicago. Furnaces in the Birmingham and Chicago districts are holding firmly for the higher prices, but the lower values are taking most of the business. The tonnage closed, however, is light in comparison with the amount under negotiation, foundrymen apparently being unwilling to engage themselves for more than current requirements. In the transactions of this character, several sales of 1,000 tons are noted and one of 5,000 tons was closed by a Tennessee interest, maximum prices being obtained for this and most of the other lots. Large melters continue to sound the market, but up to date none has bought anything like the tonnage it is in need of. Conspicuous among these feelers is the International Harvester Co., which is ready to buy 25,000 tons or more, providing a price not higher than $12, Birmingham, can be obtained. Furnaces are not yet willing to meet this view, but as soon as a common basis is reached, this purchase will be followed by a general buying movement all through this territory. In this connection it is interesting to note the stocks of iron on hand at the various southern furnaces as reported by a commission seller who recently made a trip through the south. At Sheffield, Ala., the Sloss company has 20,000 tons on hand, and at Birmingham it has about 3,000 tons, all of the latter reported sold. Three furnaces are idle. The Tennessee company has 10,000 tons on hand and two furnaces out at Bessemer, Ala. The Citico furnace has 800 tons in its yard and the Rockwood furnace 400 tons, both lots being reported sold. The Woodward Iron Co. has 3,000 tons of iron on hand, and one furnace out of blast, this stock also being reported sold. The Republic Iron & Steel Co. has 3,500 tons in its yard and one furnace out; the Alabama Consolidated has no stocks; neither has the Tutwiler furnace. The Trussville furnace has about 2,300 tons on hand, and the Tuscaloosa furnace 1,000 tons, both lots being reported sold. Other interests have 100,000 tons, including warrants. Considering the abnormally heavy melt of iron, furnace agents argue that there is no excuse for shading the $14 schedule or any reason for expecting a decline. Prices are without change this week, as follows:

Lake Superior charcoal	$19.00 to 19.25
Northern Foundry No. 1	18.80 to 19.05
Northern Foundry No. 2	18.30 to 18.55
Northern Foundry No. 3	17.80 to 18.05
Northern Scotch Foundry	18.80 to 19.05
Ohio Strong Softeners No. 1	19.80 to 20.05
Ohio Strong Softeners No. 2	19.30 to 19.55
Southern Foundry No. 1	18.15 to 18.40
Southern Foundry No. 2	17.65 to 17.90
Southern Foundry No. 3	17.15 to 17.40
Southern Foundry No. 4	16.65 to 16.90
Southern No. 1 Soft	18.15 to 18.40
Southern No. 2 Soft	17.65 to 17.90
Southern Gray Forge	16.15 to 16.40
Southern Mottled	15.90 to 16.15
Southern Silveries (4 percent to 6 percent Silicon)	17.90 to 18.15
Jackson Co. Silveries, 8 to 10 percent Silicon	22.30 to 23.30
Alabama and Georgia Car Wheel	23.90 to 24.40
Malleable Bessemer	18.30 to 18.50
Basic Iron	18.85

Rails and Track Supplies.—Rail tonnage from western roads is light, practically all of them having already contracted for their requirements. An aggregate of 20,000 tons is pending from trolley lines and small steam roads. In southern requirements the only contract of importance said to have been let was that of the Southern Pacific for 50,000 tons, which is credited to the Tennessee company. Manufacturers of track supplies have not yet named prices for 1907, and despite the tremendous buying of standard sections no contracts have been closed for the spikes, bolts and angle bars to accompany same.

We quote, standard sections, f. o. b. mill, open-hearth rails, $29; Bessemer, $28; light rails, Bessemer steel, 30 to 45-pound sections, $27 to $28; 25-pound, $28 to $29; 20-pound, $29 to $30; 16-pound, $30 to $31; 12-pound, $31 to $32, and light sections down to 8-pound, $38 to $40, all f. o. b. mill. Track supplies are quoted as follows: angle bars, 1.50c to 1.75c; spikes (for quick shipment), 2.15c to 2.25c; (for forward deliveries) 2.05c to 2.10c; track bolts, 2.65c to 2.75c base square nuts.

Merchant Pipe.—Western pipe mills are comfortably filled with business. New tonnage and specifications both show an improvement, but prices are not any stronger. Under the competition that has sprung up between the various producing interests, values have declined slightly and ¾ to 6-inch black steel pipe is now quoted 79.35 per cent discount from list, and galvanized 69.35 per cent discount. Jobbers' quotations are without change at 76½ to 77 per cent on the base sizes ¾ to 6-inch black steel pipe.

Boiler Tubes.—No change is noted in the local market. Prices are weak and there is much competition for the business under negotiation. We quote mill discounts for Chicago delivery as follows:

	Steel	Iron	Seamless
1 to 1¼ inches	46.35	43.35	53.35
1¾ to 2¼ inches	58.35	43.35	40.35
2½ inches	60.35	48.35	43.35
2¾ to 5 inches	68.35	55.35	
2¾ to 4½ inches (Seamless)			50.85
6 to 13 inches	58.35	43.35	

Less than carload lots, from store, as follows:

	Steel	Iron	Seamless Steel
1 to 1¼ inches inclusive	40	35	42½
1¾ to 2¼ inches, inclusive	50	35	35
2½ inches, inclusive	52½	35	30
2¾ to 5 inches, inclusive	60	47½	42½

Cast Iron Pipe.—The only contract of importance closed this week was that of the city of Chicago for 3,500 tons, which was awarded to the United States Cast Iron Pipe & Foundry Co. Winnipeg, Man. is figuring on about 2,000 tons, the opening of bid being advertised for June 4. Prices are very strong, but without change. We quote 4-inch water pipe $31 Chicago; 6, 8, 10 and 12-inch, $30; larger sizes $29.50; gas pipe $1 extra.

Billets and Rods.—Intermediate steel products continue very firm in price. Little new business is coming forward, as it is generally known that early deliveries are hard to obtain from western mills. Wire rods are without change at $32 Pittsburg, and forging billets at $35 Chicago.

Iron and Steel Bars.—New tonnage in iron and steel bars is of small proportions. June and July are the dull months in the agricultural implement and vehicle trades, and many manufacturers shut down and take inventory during this period. The falling in specifications for bar products which has been noticed in

the last two weeks is taken as an indication that preparations are already under way for this work, and until the season is over it is expected that consumption will keep light. The shading of the local price on bar iron continues, eastern mills being credited with the cutting. Western mills, however, are a unit in the maintenance of 1.66½c. Other prices are without change as follows, car load lots, mill shipments, Chicago delivery:

Soft steel bars and bands, 1.66½c half extras; soft steel angles, less than 3 x 3, 1.76½c; hoops, 2.06½c base, full extras; old rail stock, 1.65½c. Jobbers report a good demand from stock, with prices firm. We quote bar iron, 2.10c full extras; soft steel rounds and squares, 3 inches and larger, $2 per 100 pounds base; flats, 2 inches to 4 inches by 1⅛-inch and larger, $2 per 100 pounds base; flats, 2 inches to 4 inches by 1⅛ inch and larger, $2 per 100 pounds base; flats, 4½ inches x 5 inches and 6 inches x 5-16 inch and thicker, $2 per 100 pounds base; all ovals, half rounds, $2 per 100 pounds base; steel bands, $1.85 to $1.95 half extras; soft steel hoops, $2.30 to $2.40 full extras. Other sizes not mentioned above, $1.85 per 100 pounds base, plus half extras.

Sheets.—The consumption of sheets shows no diminution. Mills are slow on deliveries, especially on galvanized material, eight weeks being the earliest shipment that can be given. Considering the strength of present prices, consumers are not hesitating in buying for future wants and orders are plentiful. The tonnage for San Francisco needs is especially heavy. The American Sheet & Tin Plate Co. has shipped 10,000 tons of corrugated sheets and a slightly smaller quantity of black and galvanized sheets to that city in the five weeks that have elapsed since the earthquake, and the demand is still of surprising nature. Prices are now very firm. We quote mill shipments, Chicago delivery as follows:

Nos. 8, 9 and 10, 1.86½c; Nos. 11 and 12, 1.91½c; Nos. 13 and 14, 1.96½c; Nos. 15 and 16, 2.06½c. Box annealed, Nos. 18 and 20, 2.26½c; Nos. 22 and 24, 2.36½c; No. 26, 2.41½c; No. 27, 2.46½c; No. 28, 2.56½c; No. 29, 2.71½c; No. 30, 2.81½c. Jobbers' prices on less than carload lots are as follows: No. 10, 2.20c; No. 12, 2.25c; No. 14, 2.30c; No. 16, 2.40c; Nos. 18 and 20, 2.55c; Nos. 22 and 24, 2.60c; No. 26, 2.65c; No. 27, 2.70c; No. 28, 2.75c; No. 30, 3.20c.

Quotations on galvanized sheets, carload lots, mill shipments, are as follows: Nos. 10 and 11, 2.46½c to 2.51½c; Nos. 17-21, 2.81½c to 2.86½c; Nos. 22-24, 2.96½c to 3.01½c; Nos. 25-26, 3.16½c to 3.21½c; No. 27, 3.36½c to 3.41½c; No. 28, 3.56½c to 3.61½c; No. 29, 3.81½c to 3.86½c; No. 30, 4.06½c to 4.11½c. From store, galvanized sheets, less than carload lots, are quoted as follows: No. 10 to 20, 3c to 3.10c; Nos. 22 and 24, 3.15c to 3.25c; No. 26, 3.35c to 3.45c; No. 27, 3.55c to 3.65c; No. 28, 3.75c to 3.85c; No. 30, 4.95c to 5c.

Merchant Steel.—Except that specifications continue good, the market is without features of interest. The demand has been very heavy this season and one manufacturer of plow steel announces its withdrawal from the market. Prices are firm and without change; mill shipments for Chicago delivery being quoted as follows:

Spring steel, 2.10c; sleigh shoe, flat sizes, 1.71½c; concave and convex, 1.86½c; cutter shoe, 2.35c to 2.40c; smooth finished machinery steel, 1.91½c; smooth finished tire, 1.86½c base; plow steel, 2.20c and upward, according to quality; toe calk steel, 2.21c; railway spring, 1.86½c. Cold rolled shafting, 50 per cent off in carload lots and 45 per cent in less than carload lots. Crucible tool steel, 6½c to 8c; special grades of tool steel, 13c and up.

Plates.—Little or no change is noted in the local field. Specifications for sheared plates are slow in coming forward and mills are pressing their customers for shipping instructions. On the contrary, universal plates are selling very freely and it is impossible to get delivery within one month to six weeks from the date of placing order. Quotations are without change as follows:

Tank steel, ¼-inch and heavier, up to 100 inches wide, 1.76½c base; flange steel, 1.86½c base; marine steel, 1.96½c base; all full extras. Plates 3-16 inch thick, $2 extra; gauges, 7 to 8, $3 extra; No. 9, $5 extra. Less than carload lots, $5 extra. We quote from local stocks; tank steel ¼ inch and heavier, up to 72 inches wide, 2c to 2.10c; 72 inches to 96 inches wide, 2.10c to 2.20c; 3-16 inch up to and including 60 inches wide, 2.10c to 2.20c; 3-16 inch 72 inches wide, 2.35c to 2.45c; No. 8, up to 60 inches wide, 2.15c to 2.25c; flange steel, 25c extra; heads, 25c extra.

Structural Steel.—Railroads have been the most active purchasers of structural steel during the week under review. Among the contracts closed was that of the Chicago & Northwestern railway for 4,200 tons of bridge material which was awarded to the Pennsylvania Steel Co., this mill also receiving the contract for the fabrication and erection of same. The Great Northern railway ordered 1,000 tons of bridge material from the American Bridge Co., and the Santa Fe 200 tons. The Missouri, Kansas & Texas has let the contract for its new shops at Parsons, Kansas, which will require about 500 tons of steel, to the Brown-Ketcham Iron Works, Indianapolis. There was a good run of small orders for steel for building purposes, principal among which was the contract for the steel work for the Y. M. C. A. building at St. Louis, requiring about 500 tons, which was let to James Stewart & Co. Movement from local stocks is good and jobbers' prices are firm. Mill quotations for Chicago delivery are as follows:

Beams and channels, 3 to 15 inches, inclusive, 1.86½c; angles, 3 to 6 inches, 1.86½c; angles, larger than 6 inches, on one or both legs, 1.96½c; beams, larger than 15 inches, 1.96½c; zees, 3 inches and over, 1.86½c; tees, 3 inches and over, 1.91½c, with the usual extras for cutting to exact lengths, punching, coping, bending, or other shop work.

Quotations on lots from store are as follows: All angles three inches and larger, including six inches, $2.25 per 100 pounds base; angles over six inches, $2.35 per 100 pounds base; tees, three inches and larger, $2.30 per 100 pounds base; beams, three inches to fifteen inches, inclusive, $2.25 per 100 pounds base; beams, eighteen inches and larger, $2.35 per 100 pounds base; channels, three inches and larger, $2.25 per 100 pounds base.

Wire Products.—No let-up is noticed in the demand for nails, fencing and other wire materials. This is an unusual condition of affairs, as in past years mills have always felt a decline at this time of the year. The heavy shipments to San Francisco in the past month have retarded deliveries to other points, and stocks in agricultural districts are reported low. For this reason as well as the unusually heavy consumption in all other lines, it is not expected that mills this summer will follow their customary practice of shutting down for a few weeks. Prices are without official change although some jobbing interests are said to be shading the retail quotations. We quote carload lots to jobbers, Chicago delivery as follows:

Wire nails, $2; painted barbed wire $2.15; galvanized barbed wire, $2.45; smooth annealed wire, $1.85; smooth galvanized wire, $2.15; polished staples, $2.15; galvanized staples, $2.40. Carload lots to retailers, 5 cents higher than above prices; less than carload lots, 15 cents higher.

Coke.—This is an erratic market on fuel. The daily receipts from Connellsville and Virginia ovens are heavy, and to escape the demurrage charges some low prices have been made by local dealers. Connellsville 72-hour grades are quoted at $2.75 to $2.90 ovens or $5.40 to $5.55 Chicago. Wise County coke is offered at $4.75 to $5. Chicago and Solvay coke are at a price equivalent to the delivered price of the better grades of Connellsville fuel.

Old Material.—The market in a general way has continued quiet in the past week and sales have been few. With the hot weather near at hand, the outlook is not very bright and considerably lower prices are expected to rule before the end of June. Mills are plentifully supplied with materials and dealers also have large stocks on hand. The listlessness of the market is evidenced by the fact that the Illinois Central was able to sell last week only 2,000 tons of a list of 4,000 tons, and that the Burlington road also failed to dispose of all the material offered in its list of 4,000 tons issued a week ago. This week the Chicago and Northwestern has a new list out of 1,000 tons. Prices are without change but are inclined to softness. We quote as follows, gross tons being mentioned in the first paragraph:

Old Steel Rails (4 feet and over)	$16.00 to 16.50
Old Steel Rails (less than 4 feet)	14.50 to 15.00
Old Car Wheels	18.25 to 18.50
Old Iron Rails	21.00 to 21.50
Relaying Rails, subject to inspection	27.00 to 27.50
Heavy Melting Steel	14.00 to 14.50
Mixed Country Steel	11.50 to 12.00

We quote as follows net tons:

No. 1 R. R. Wrought	$14.50 to 15.00
No. 2 R. R. Wrought	13.50 to 14.00
Shafting	16.00 to 16.50
Dealers' Forge No. 1	12.50 to 13.00
Wrought Pipe and Flues	10.50 to 10.75
No. 1 Cast, 150 pounds and less	13.50 to 14.00
No. 1 Mill	9.00 to 9.50
Mixed Busheling (No. 1 & No. 2)	10.00 to 10.50
Country Sheet	8.00 to 8.50
No. 1 Boilers Cut	10.00 to 10.50
Boiler Punchings	12.00 to 12.50
Iron Car Axles	23.00 to 23.50
Steel Car Axles	18.50 to 19.00
Iron Axle Turnings	10.50 to 11.00
Cast Borings	8.50 to 9.00
Mixed Borings, etc.	8.50 to 9.00
Machine Shop Turnings	10.25 to 10.75
Railroad Malleable	13.50 to 14.00
Agricultural Malleable	12.50 to 13.00
Stove Plate and Light Cast Scrap	11.00 to 11.50
Old Iron Splice Bars	16.50 to 17.00

CLEVELAND.

Ore Movement Hampered by Car Shortage and Crowding of Upper Lake Docks.

OFFICE OF *The Iron Trade Review*,
BROWNING BUILDING, May 29.

Iron Ore.—While every effort is being directed toward a record movement, it is a fact that the tonnage now being brought down is not so heavy as was hoped for earlier in the season. This is accounted for partly by the shortage of cars on the ore-carrying railroads on the ranges and partly by the limited capacity of upper lake docks which have not been greatly extended to accommodate the larger requirements of the present year. The trouble is almost entirely at Lake Superior ports, as Lake Erie docks have been practically relieved of the congestion due to the recent longshoremen's strike. Minor labor troubles are in a fair way to be speedily adjusted, and in view of the known attitude of union officials against a strike no further difficulty in this direction is expected. There has been no additional chartering of late, and a considerable number of vessels are idle with prospects for business not the brightest. No ore sales are reported and prices are nominally based on $4.25 Old Range Bessemer.

Pig Iron.—The pronounced and increasing strength of Bessemer iron continues a feature of the market. During the week one lot of 10,000 tons for third quarter delivery was sold by an independent interest on the basis of $17.35 valley and a smaller lot went at $17.40. In basic iron two third and fourth quarter contracts involving between 15,000 and 20,000 tons are pending. A sale of 1,000 tons at $17.00 is reported with a small lot of off basic at a slightly lower figure. In view of the strength of Bessemer and basic the prevailing prices of foundry are remarkable. These continue unchanged from those of last week, $16.00 to $16.25 valley, with the usual run of small sales. Several large interests are out of the market as they regard these prices as unattractive. Spot furnace coke is obtainable at $2.35 at the ovens. We quote, Cleveland delivery, as follows:

Bessemer	$18.10 to 18.35
No. 1 Foundry	17.25 to 17.50
No. 2 Foundry	16.75
No. 3 Foundry	16.25 to 16.50
No. 2 Southern	17.85 to 18.10
Gray Forge	16.35 to 16.85
Gray Forge, Southern	15.85 to 16.35
Lake Superior, charcoal	19.50 to 20.00

Finished Materials.—Opinion on the sheet situation has crystallized into the belief that an advance of $2.00 and possibly of $4.00 will be announced shortly. This will afford little relief, however, as the present stringency is due to the scarcity of sheet bars. One good order recently placed for immediate delivery was at a $4.00 premium. Plates are in improved demand and the question of second half contracts is coming up with no hesitancy manifested by consumers as there is no chance of lower prices. Mills are giving early deliveries, but are slowly getting behind. A lighter demand for structural materials is reported by jobbers and sales agents catering to the premium business, but mills report specifications heavy. The 250 tons of steel required for the new shop of the Champion Rivet Co. will be furnished by the National Iron & Wire Co. Steel bar business is good, but the bar iron situation, while firm, is easier.

Old Materials.—Trading is at a standstill, as has been the case for some weeks past, and still lower prices are anticipated. Our quotations, f. o. b. Cleveland, are of necessity largely nominal, as follows:

Old iron rails	$20.00 to 21.00
Old steel rails (over 6 feet)	16.50 to 17.00
Old steel rails (under 6 feet)	16.00 to 16.50
Old car wheels	16.50 to 16.75
Steel boiler plate	12.00 to 13.00
Steel axles	19.00 to 20.00
Malleable iron (railroad)	15.00 to 15.50
Malleable iron (agricultural)	13.00 to 13.50
Heavy steel	14.50 to 15.00
Country mixed steel	13.00 to 13.50

We quote net tons, as follows:

No. 1 R. R. wrought	15.50 to 16.00
No. 1 busheling	12.00 to 12.50
No. 1 machine cast	13.50 to 14.00
Iron axles	22.00 to 23.00
Axle turnings	11.00 to 12.00
Wrought turnings (free from cast)	9.00 to 9.50
Grate bars	10.00 to 10.50
Pipes and flues	11.50 to 12.00
Tank iron	10.50 to 11.00
Hoop and band iron	7.50 to 8.00
Sheet iron	6.50 to 7.00
Wrought drillings	9.00 to 9.50
Stove plate	10.00 to 10.50
Cast borings	7.00 to 7.50

NEW YORK.

Foundry Iron in Fairly Good Demand, Steel Grades Stiff, and Mill Iron Weak.

OFFICE OF *The Iron Trade Review*,
ROOM 1315, No. 150 NASSAU ST., May 29.

Pig Iron.—There has been a fairly good volume of routine buying of pig iron. Transactions in foundry grades have been confined to small lots to regular customers, but the tonnage is large in the aggregate. Some shading of prices is reported in the lower grades, but in general quotations have been well sustained. Buying of small lots for early shipment is, if anything, increasing and requests for rush shipment on old contracts are still frequent. A number of heavy tonnages which made their appearance earlier in the week in a hesitating sort of way are held up apparently in the hope of obtaining better terms. The American Brake Shoe & Foundry Co. filled its requirements of about 2,500 tons with New York state and New Jersey iron, in addition to considerable purchases of southern iron earlier in the week. Among other sales of foundry iron were 200 tons No. 2 Alabama, 300 tons of Virginia, one of 1,000 tons, another of 400 and two of 850 tons each. In addition there were a host of small "fill in" orders. In mill iron there were a number of transactions making a respectable total, among others one lot of 1,000, one of 500 and another of 250. Pipe manufacturers are in the market for several thousand tons of this grade and they seem to expect to secure concessions. Steel irons are in good demand, but sales have not been large. Nothing in Bessemer has come to light locally, and basic sales did not amount to over a few thousand tons in all. Among other sales of basic were one lot of 2,000 tons, and two of 1,000 each. The molders' strike has not made much headway during the week. Foundry workmen in New York and neighboring towns of New Jersey made demands for an increase some time ago with a threat to suspend on June 1. Foundrymen are not greatly alarmed, the majority believing that the molders will not venture on a contest at this particular time. Coke has recovered somewhat from its weakness of a week ago, but most orders are still of the fill in variety.

Northern No. 1 Foundry	$18.25 to 19.00
No. 2 Foundry	17.75 to 18.50
No. 2 Plain	17.50 to 18.00
No. 1 Southern Foundry	18.00 to 18.50
No. 2 Southern Foundry	17.50 to 18.00
No. 3 Southern Foundry	16.75 to 17.25
No. 4 Foundry	16.50 to 17.00

Pig Iron Certificates.—Trading on the New York Produce Exchange has been dull and featureless. There were very few sales and these were confined to the regular classification. The supply of regular in the yards has been reduced to less than 1,400 tons. When this is exhausted, trading in standard foundry contracts is expected to begin in earnest. The following are today's quotations for standard foundry contracts.

Standard Foundry Contracts.

	Bid.	Asked.
May	17.00	17.40
June	17.15	17.50
July	17.15	17.60
October	17.00	17.45

Finished Iron and Steel.—Business in steel has been light during the past week. Unless some of the immense rail tonnage which has been pending for some days is placed within one or two days the last week of May will be the dullest in many months. There is, however, enough business under negotiation in both structural material and rails to bring the month well up to the average. New business in structural steel has been limited to small lots of which there were many, but the total is much less satisfactory than it has been reported to be. Three large contracts reported last week —not in these columns—to be "practically closed," 28,000 tons for the tunnel terminal of the Hudson Co., 12,000 for the building of the City Investment & Contracting Co., and 15,000 tons for the steel plant at Gary, were at the time no farther advanced toward actual signature than they had been two or three months before. It is well understood that these contracts must be placed at some time, but the final adjustment may be delayed many days and even weeks. It has been a week of small orders. The American Bridge Co. secured contracts for bridges from the following roads: C., E. & Q.; Michigan Central; Lake Shore; Chicago & Alton; Pennsylvania; Erie; and the Austin & Maine, but the total was only about 600 tons. The American Bridge Co. also booked an order for 700 tons of steel for the Bronx Borough Hall. The Baltimore Bridge Co. has been awarded the contract for 2,000 tons of steel for piers on the B. & O. at Locust Point. Orders have been taken for 400 or 500 tons of steel for a Y. M. C. A. building in St. Louis, and 300 tons for the M. K. & T. plant at Parsons, Kas. The iron bar market is in an unsatisfactory state. The demand is only fair.

The following are prices at tidewater: Angles, 3 to 6 inches x ¼ inch and heavier, 1.84½c; beams, 3 to 15 inches, 1.84¼c; tees, 3 x ¼ inch and heavier, 1.89½c; plates, carloads, tank, 1.74½c; flange, 1.84½c; marine boiler, 2.41½c; refined iron bars, 1.64½c; soft steel bars, 1.64½c; sheets, No. 28 black, 2.40c.

Old Material.—The market for scrap of all kinds is weak. The only encouraging note in local circles during the week has been a report of large sales of relaying rails in the Pittsburg district. There were no sales of note in this market up to date. The following are prices approximately f. o. b. tidewater:

Old iron rails	$21.00 to 22.00
Old steel rails, long lengths	15.00 to 15.50
Old steel rails, short pieces	14.50 to 14.75
Relaying rails	24.00 to 25.00
Old car wheels	17.00 to 18.00
Old iron car axles	26.00 to 27.00
Old steel car axles	19.00 to 19.50
Heavy melting steel scrap	15.00 to 15.50
No. 1 railroad wrought scrap	17.50 to 18.50
Iron track scrap	17.00 to 17.50
Wrought pipe	12.00 to 13.00
Cast borings	9.00 to 9.50
Wrought turnings	13.00 to 13.50

PHILADELPHIA.

Large Sales Give Life to the Pig Iron Market—Scrap Very Weak.

May 29.

Pig Iron.—Large sales of small lots of iron during the past week has made it plain that very many consumers, both big and small, have not secured their requirements for the third quarter. This fact, coupled with urgent demands for immediate delivery, has kept the market strong and firm, with rather an upward tendency in prices. Unless present indications are misleading, June should bring a big rush of orders to the furnace men, who having practically no stock on hand, are thus assured of activity for some time. Basic iron has been very strong, and an order for 4,000 tons is reported placed by a Schuylskill Valley industry with a Lehigh Valley producer at $17.85. The Baldwin Locomotive Works' order, for which there has been considerable competition, went to a New Jersey producer. Local pipe founders, who are reported to be unusually shrewd buyers, are making large purchases for their works, which are extremely busy. The strike of the foundry molders appears to have little effect in this market as compared with some other industrial centers. Prices show little change, but it may be said that the tendency is toward the outside range rather than to the lower. We quote as follows:

No 1X Foundry	$19.00 to 19.50
No. 2X Foundry	18.50 to 19.00
No. 2 Plain	18.25 to 18.50
Standard Gray Forge	16.50 to 16.75
Basic	17.75 to 18.00
Low Phosphorus	25.00 to 25.50
Southern No. 2X rail	18.75 to 19.00

New Material.—With the exception of bar iron, which continues weak, trade may be said to be fairly good. Orders are not so plentiful as they were a short time ago, but the mills have plenty to do on old specifications, especially in structural material, and there is a hopeful feeling that any existing clouds will soon roll away. In the meantime scheduled prices remain unchanged as follows:

Beams, channels and angles according to specifications, 1.83½c to 2.00c; refined iron bars, 1.63½c to 1.73½c; steel bars, 1.63½c to 1.73½c; plates, 1.73½c to 1.83½c.

Old Material.—With railroad embargoes placed on all but one of the local mills that consume scrap, and practically no orders from any of them, the market is almost lifeless, with a decided tendency toward lower figures. There is apparently no prospect of improvement in the immediate future, unless bar iron stiffens in price. Prices may be quoted as follows:

Old steel rails	$16.00 to 16.25
No. 1 steel scrap	16.00 to 16.25
Old steel axles	19.50 to 20.00
Old iron axles	25.00 to 25.50
Old iron rails	21.00 to 21.50
Old car wheels	16.00 to 16.75
Choice scrap, R. R. No. 1 wrought	18.50 to 19.00
No. 1 yard scrap	16.00 to 16.75
Machinery scrap	15.50 to 16.00
Low phosphorus scrap	20.00 to 20.50
Wrought iron pipe	13.75 to 14.25
No. 1 forge fire scrap	14.00 to 14.50
No. 2 forge fire scrap, ordinary	9.75 to 10.25
Wrought turnings	13.00 to 13.25
Axle turnings, heavy	13.50 to 14.00
Cast borings	9.50 to 10.00
Stove plates	11.50 to 12.00

CINCINNATI.

Pig Iron Market Dull, but Prices Are Well Maintained.

May 29.

Pig Iron.—The past week has been exceedingly quiet in point of orders and inquiry. The small amount of business that is being done in foundry irons is confined to prompt shipment business running from a car load up to 100 tons and inquiries are mostly for special irons for prompt delivery to be used in working up stock. The 12,000 tons inquiry from an Ohio pipe maker was not placed and it was given out that the buyer decided not to purchase at this time. One reason assigned was that quoted prices were not satisfactory and a belief on the part of the intending purchaser that lower figures could be obtained by waiting. There is practically no disposition on the part of the general run of melters of foundry iron to cover their wants for the last half of the year and it looks now as though they would stay out of the market until present contracts were worked out or buy from hand to mouth. The furnace interests, while apparently recognizing this to be the situation, are maintaining prices with considerable uniformity in spite of the lack of new business and this feature is an element of strength in the situation when it is considered that the dullness has been prolonged beyond the time when buyers might have

been expected to come in for their second half of the year supplies.

We see nothing in the situation this week to justify a change in quotations, although it is intimated that northern furnaces are weak at $16.00 for No. 2 foundry and malleable. Virginia basic is still quoted at $16.00 and valley basic nominally $17.00 to $17.25 at furnace. Southern iron remains at $13.75 to $14.00 with an occasional quotation of $13.50 Birmingham. The following sales and inquiries are fairly representative of the market.

Sales.

500 tons Virginia silvery 4 to 5 per cent silicon, third quarter delivery, at private terms.

100 tons northern foundry, at $16.00 furnace.

500 tons malleable Bessemer, third quarter delivery, at $16.00 furnace.

250 tons, malleable Bessemer, May and June delivery, $16.00 furnace.

100 tons, Southern No. 2 soft, prompt shipment, at $14.00 Birmingham.

1,000 tons of malleable, deliveries August to December at $16.00 northern furnace.

100 tons No 3 foundry, prompt shipment at $15.50 Ohio furnace.

Inquiries

1,000 tons of malleable for a point in the south for delivery in next 30 days.

1,000 tons low phosphorus iron, in St. Louis territory.

500 tons of southern and 1,000 tons of northern for delivery in next two months, to a manufacturer in Indiana.

800 tons malleable, next three months delivery to a point in Michigan.

A large Ohio melter is in the market with no specified tonnage.

Quotations f. o. b. Cincinnati are as follows:

Southern Foundry No. 1	$17.25 to 17.50
Southern Foundry No. 2	16.75 to 17.00
Southern Foundry No. 3	16.25 to 16.50
Southern Foundry No. 4	15.75 to 16.00
Southern Foundry No. 1, soft	17.25 to 17.50
Southern Foundry No. 2, soft	16.75 to 17.00
Gray Forge	14.75 to 15.00
Northern Foundry No. 1	17.65 to 18.15
Northern Foundry No. 2	17.15 to 17.65
Northern Foundry No. 3	16.65 to 17.15
Jackson County Silvery, 8 per cent	21.15 to 21.65
Southern Charcoal	22.75 to 23.25

Finished Material.—The market remains steady to firm with no quotable change in prices. Bar iron is dull.

We quote: bars at 1.63c, half extras, with dealers quoting 1.85c for iron and steel out of store. Galvanized sheets, No. 10 and No. 12, in car lots are 2.58c. We quote black sheets, No. 27 at 2.40c in car lots of 500 bundles. Black sheets out of store are selling as follows: No. 28, 2.85c; No. 27, 2.75c; No. 16, 2.35c; No. 14, 2.25c; No. 12, 2.15c. Tank plates are firm and sell out of store at 2c to 2.10c for ¼-inch and 2.10c for 3-16, Nos. 8 and 10. Beams and channels are quoted at 2.25c to 2.35c from stock and angles at 2.10c to 2.15c for base sizes.

In merchant pipe there is a firm undertone to the market but no quotable change in prices. We quote f. o. b. Cincinnati as follows:

MERCHANT PIPE.
(Basing Discounts)

	Steel Pipe		Guaranteed Wrought Iron Pipe	
	Black Per cent	Galv. Per cent	Black Per cent	Galv. Per cent
⅛ and ¼ inches	69.7	58.7	....	....
⅜ inch	73.5	61 3	....	....
½ inch	73 7	61 7	....	....
¾ to 6 inches	77.7	67.7	....	....
7 to 12 inches	72.7	57.7	....	....

Coke.—While the market has made no particular change the past week, there is a little more interest in forward contracts and some fair sized orders have been placed. Prices are unchanged. Quotations in the leading coke producing districts are as follows:

Wise County, Va. Furnace Coke prompt shipment	$2.50 per ton
Wise County, Va. Foundry Coke prompt shipment	2.75 to 3.00 per ton
Pocahontas Furnace Coke prompt shipment	$2.25 to 2.50 per ton
Pocahontas Foundry Coke on contracts	2.75 to 3.00 per ton
Connellsville Furnace Coke prompt shipment	2.50 per ton
Connellsville Foundry Coke prompt shipment	2.75 to 2.90 per ton
New River Foundry Coke on contracts or prompt shipment	2 75 to 3.00 per ton
New River Furnace Coke, prompt shipment	2.50 per ton

†Wise County, Va., Coke on Furnace contracts is sold mainly on a sliding scale basis for pig iron prices on the following basis: $1.65 per ton on $9.00 pig iron, plus 17 per cent of the advance on pig iron above $9.00 Birmingham

Old Material—The market is quiet and unchanged. We quote f. o. b. Cincinnati.

Old No. 1 railroad wrought, net tons	$14.00 to 14 50
Cast machine and foundry, net tons	12 50 to 13.00
Old iron rails, gross tons	20 00 to 20.50
Old steel rails, gross tons	15 50 to 16 00
Old short lengths, gross tons	16 00 to 17 00
Old iron axles, net tons	22 00 to 23.00
Heavy melting scrap, gross ton	15.00 to 15 50
Stove plate, net tons	10 00 to 10.50
Wrought turnings, net tons	9.50 to 10.00
Cast borings, net tons	7 00 to 7.50
Car wheels, net tons	16.00 to 16.50

BIRMINGHAM.

Steady Demand for Pig and Prices are Firmer.

May 28.

The iron manufacturers in the Birmingham district announce that there is a steady demand for iron, but nothing out of the ordinary. The past week was a quiet one as far as trading goes, though it was admitted in more than one office that as much iron was sold as was manufactured. A steady line of inquiry is being received and there is much confidence in the future mart. The make is to be improved by the blowing in of at least two furnaces in the next few days. There is no apprehension that there is to be any accummulation of iron in this district. The home consumption is very large, the demand right now in the south taking a large quantity of the output. Five furnaces in this district are on basic iron and this product is going into steel as rapidly as it is being produced. There is evidence that some of the larger consumers of iron are holding off a little in their purchasing, the purpose of which cannot be ascertained. There is no tendency noticeable in this district to reduce iron prices, to the contrary almost all of the manufacturers taking a bold stand to maintain quotations. No. 2 foundry is being sold at $14 per ton and rumors do not prevail any more that a lower price is being accepted for the product.

A number of changes in the management at iron and steel plants of several of the companies will take place this week in the Birmingham district. The new vice president and general manager of the Tennessee Coal, Iron & Railroad Co. and of the Alabama plants of the Republic Iron & Steel Co., Frank Crockard, will take hold of the duties during this week. There will be other changes, such as a general furnace manager for the two companies, furnace manager at Ensley, coke production manager, coal production manager, furnace manager at Oxmoor and what not.

ST. LOUIS.

Molders' Strike Practically Settled and Pig Iron Market Improves.

May 28.

A settlement of the molders' strike, which has tied up all the foundries in Belleville and crippled work in Granite City since the first of May, has practically been reached. A basis of agreement was reached at a conference between representatives of the unions and the various foundries in St. Louis this morning and it only remains for the unions to ratify this agreement. In the meantime the molders will return to work pending ratification, which is practically assured. Concessions were made by both sides. An advance of fifty cents a day for floormen, who have been receiving three dollars a day for nine hours' work, and the same advance for machine men, who have been getting $2.80, was asked, but the conference agreed upon a nominal advance which will amount to only a few cents. The exact terms will not be given out till final adjudication.

Since Friday night a settlement has been in prospect and even before papers were drawn today one house had received inquiries from Belleville aggregating 500 tons. While the pig iron market has been rather slow all week, with frequent soft spots, a much better tone is given by the labor adjustment. No large orders were booked this week, melters buying only in one, two and three carload lots for immediate consumption. The strengthening of the southern pool to maintain the $14.00 price is taken as another indication of the real weakness of the market, and large consumers are

inclined to hold off still further before placing extended orders: $14.00 continues the top price, with sales generally closed at $13.75. There are reports of $13.50 being done.

After a long struggle Rising Fawn has succeeded in increasing its differential from 10 to 25 cents, so that now it has the same advantage over Birmingham as Chattanooga. Some time ago it was reported that furnaces were going to retain this differential as their own profit, but they never fail it seems to sacrifice it upon desirable business.

About the best sales of the week are two 500-ton lots and one 250-ton lot to northern Illinois interests by Hickman, Williams & Co. There was another lot of 250 tons of high phosphorus iron for the same interests at $13.75. It is reported that the order on an inquiry for five thousand tons of basic by the Commonwealth Steel Co., which it was said had gone over indefinitely, has been placed privately. One house reports the sale of one hundred tons southern No. 2 to a Montana melter. Some little high silicon iron has been sold on the basis of nineteen dollars East St. Louis. Inquiries are few. One Illinois foundry is in the market for one thousand tons, Belleville wants 500 tons, and Canadian interests have asked figures on 300 to 500 tons of malleable.

Coke is unchanged, the demand being quiet. Iron quotations, including the freight rate of $3.50 to East St. Louis, are as follows:

Southern No. 1	$17.75 to 18.25
Southern No. 2	17.25 to 17.75
Southern No. 3	16.75 to 17.25
Southern No. 4	16.50 to 17.00
Gray Forge	16.25 to 16.75

Finished Materials.—All sorts of building materials are in demand but no large contracts were closed during the week. James Stewart & Co. expect to put out the new specifications for the Maison Blanche department store at New Orleans this week.

Metal Market

NEW YORK.

May 28.

Pig Tin.—After a week of violent fluctuations the market is weak and lower. The following are today's quotations: Spot, 39¾ to 40¼; June, 39½ to 40; London, £182 10s. Arrivals for the month to date, 2,737 tons; afloat, 2,153 tons.

Lead.—The market has been depressed by free offerings and the close was quiet. Today's closings, 5.85 to 5.95; St. Louis, 5.90; London, £16 16s 3d.

Spelter.—The demand has been less and dullness prevails. Today's closings, 5.85 to 5.95; St. Louis, 5.75; London, £26 17s 6d.

Antimony.—The market has been quiet with no material change in prices. Today's quotations, Cookson's and Hallett's, 25 to 26; other grades, 24½ to 25½.

ST. LOUIS.

May 28.

While there has been some bidding for lead at the steady rate of $5.90 and holders have even been asking more, the general market today has been lower at $5.87½. No sales were reported today, and few during the week. Zinc prices held firm in the Missouri-Kansas field during the week and in harmony. Spelter, too, was stronger in the local market, being held steady, though with little trading; $5.80 bid held higher.

The interior of the forging shop of the Toronto Bolt & Forging Co., at Swansea, a suburb of Toronto, was destroyed by fire May 21. The damage to the building and machinery amounted to $200,000 and the insurance to about $75,000. The company will rebuild at once, and in the meantime temporary buildings are being erected so that operations may be resumed as soon as possible. The force employed, now out of work, numbers 350.

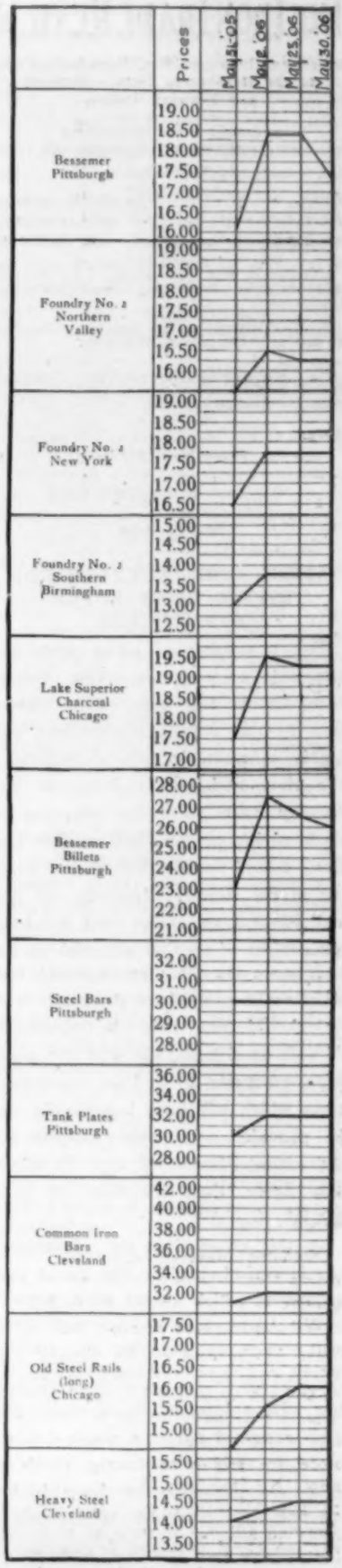
Count Julian de Ovies, recently appointed commercial commissioner to the United States from Chili, has arrived in this country with the avowed intention of increasing trade between the two countries. He is also accredited Chilean consul at Pittsburg, his government having an increasing interest in the development of the iron and steel industry.

The first run of steel from the eleventh open-hearth furnace at Ensley at the big steel plant of the Tennessee Coal, Iron & Railroad Co. was made last Wednesday and was a success. The furnace is the largest in the south and it is expected that its operation will be steady and successful.

W. H. Sterling, coke ovens manager of the Pratt division for the Tennessee Coal, Iron & Railroad Co., has been appointed general superintendent of the coke ovens of the Republic-Tennessee company, with headquarters in Birmingham.

Electric motors of a maximum output of 10,000 horsepower are being installed at rolling mills in Teschen, northern Austria-Hungary, and at Budapest mills even larger motors are being erected.

PRICE CHART.



THE IRON TRADE REVIEW

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STEEL CONSTRUCTION FOR STEAM BOAT SUPERSTRUCTURES.

For a number of years past, our esteemed contemporary, *The Engineering News*, has been calling attention to the flimsily constructed and highly inflammable superstructures of the river and harbor boats in this country, with particular reference to those plying on the Hudson river and Long Island Sound. The recent burning of the steamer Plymouth, of the Fall River Line, at her dock has been the subject of another editorial by our contemporary. It takes a stand that all steamboats used for passenger traffic should not only be constructed with steel hulls, but with fire proof superstructures, or at least superstructures which will burn less readily and be provided with better means for the extinguishment of any fire which may occur than are those at present.

In this contention, our contemporary is entirely right. The awful consequences which attend a fire upon a crowded passenger steamer were illustrated in the case of the General Slocum, which burned in New York harbor with a loss of life of over 1,000. This occurred within a short distance of shore and within easy reach of what are probably the finest harbor fire-fighting appliances in the world. Yet, so rapid was the destruction of the upper portion of the vessel that before any aid could be given her, she was burned to the water's edge with appalling loss of life. The burning of the Plymouth fortunately occurred when there were few people on board, and these few were employes, all more or less familiar with the boat. Yet, so rapid was the spread of the fire that one of these men, who probably knew his way about the ship and who had only himself to take care of, was not able to escape. Had this fire occurred at night in the middle of Long Island Sound when the vessel was loaded with sleeping passengers, the consequences would have been too horrible to contemplate.

It does not seem, at first glance, an impossible or even difficult problem to render these boats more safe. The superstructures are, at present, almost entirely of wood construction. In these days of economical production of iron and steel, it seems criminal that so dangerous a material as wood should be employed in such a place. Steel columns, girders and floor beams could, undoubtedly, be employed in place of wood, and metal sheathing is no experiment. It might be contended that the decorative effects contained in the interior of these boats are impossible without the use of wood, but is it worth while to sacrifice hundreds of lives, from time to time, for the sake of more or less glaring ornamentation? Nor are we ready to admit that wood is absolutely necessary for this purpose. Expanded metal and plaster partitions might be employed and handsomely decorated and stamped metal ceilings could be made to give almost, if not quite, as artistic an effect as highly carved wood. While there may be engineering difficulties in the way of substituting steel for wood in these boats, we do not believe that they are insuperable. There is, undoubtedly, a field for the extensive use of steel if the matter is only properly taken up.

THE GAYLEY DRY AIR BLAST.

Seldom has a new proposition in the technics of iron manufacture been more thoroughly aired and discussed than the Gayley dry air blast. At the New York meeting of the Iron and Steel Institute in October, 1904, Mr. Gayley read his famous paper, showing the results he had achieved at the Isabella furnace, the air being dried by refrigeration, whereby the output of pig iron was greatly increased and the coke consumption per ton of iron much decreased. Immediately there came a flood of comment and criticism. There appeared, of course, those whose mental constitution it is difficult for many people to understand, who explained that they knew all about these advantages years ago, but did not do anything. There were others who showed by figures that Mr. Gayley's results could not have been achieved, despite the material fact that they had been. There were others who sought to explain more fully why the results were reached, and these gave actual information which helped the cause of the dry air blast.

It is fortunate that Mr. Gayley's paper elicted such widespread discussion. More light has been thrown on the subject, and his position has been well vindicated. It seems to have been established that part of the results were reached merely through the uniformity of the blast, as to dryness, and that the best commercial results may be attained where the drying is carried less than to the limit, but reaching a point where uniformity is obtained, and it may be that some other means than refrigeration will be found to be the most practicable for drying the air. Compression has been suggested as a means of reaching a dead level of sufficient dryness. This has nothing to do with Mr. Gayley's position, which was as to the results to be achieved by the use of a dry air blast, and that position has been fully established.

NO IRON ORE FAMINE.

Not long ago there was a regular wave of utterances from people in various walks of life touching the world's future supply of iron ore, it being held with a positiveness which seemed, perhaps naturally enough, to be in inverse ratio to the amount of information in hand, that the world would run very short of iron ore in half a century or so. That wave has subsided, the persons implicated having probably sought other fields to conquer,—the expression being used advisably, as conquest is easy when the conqueror is the arbiter.

There is really no reason to suppose that the world will not find all the iron

ore which will be called for by many generations to come. England furnishes a good example of success under apparently very adverse circumstances as to iron ore. Years ago it was assumed that England's own supplies of ore were decidedly on the wane, and there were fears of the Spanish supply. Allowance must be made for the proverbial inclination of the British manufacturer to regard his business as ruined. The fact is that last year Great Britain made the largest tonnage of pig iron in the country's history, with a very substantial gain over 1904. Statistics of the domestic ore production in 1905 are not yet available, but the figures of imports show that the gain was not as large as would be required for the increase in pig iron production, indicating that Great Britain's own production of ore increased from 1904 to 1905. It will be many decades, and perhaps centuries, before the United States is as bare of iron ore as England has been for years past.

An indication that the fever of excitement over the world's poverty in iron ore has subsided is the action of the Swedish government on the iron ore export duty question. One of the Swedish houses of parliament some time ago passed a bill to place an export duty on iron ore. Later the other house voted down the measure, and a combined vote of both houses did the same. The latest reports are that the matter is indefinitely postponed. The Swedish government seems to have concluded rightly enough that the country can well afford to export iron ore when it brings so much money into the country and the limited ability to turn the ore into finished product at home is in no degree impaired by the export movement.

One result of the rehabilitation of Russia which is now going on will be an expansion in the production and consumption of iron. In this department last week a table was printed showing the pig iron production of various countries of the world from 1890 by five-year periods. In the case of Russia the production in 1904 had to be used as the production in 1905 has not been made public. There was an increase from 912,561 gross tons in 1890 to 2,931,257 tons in 1904, so that Russia more than tripled her production in 14 years. No other country did as well in 15 years, except those whose production was relatively small, not reaching half a million tons in 1905. Hitherto the home production of Russia, and the heavy imports, have been used almost exclusively by the government railways. In the future one can expect a more general demand. Comparatively little is known about the iron ore resources of the country, except that they are very large. The development so far has been in the face of great difficulties, the ore and fuel being far apart. With so good a record thus far, it can be seen that stupendous results would follow active exploitation and the building of railroads. Even should Russian fuel supplies prove inadequate, there is nothing to prevent the ore going out of the country or the fuel coming in, at the discretion of the Russian government.

Prospects in Germany are good. The great Minette district, the largest known deposits of iron ore in the world, does not furnish the richest ore, but the production of pig iron has shown a good increase. In six years, to 1905, the production of Germany as a whole increased 13.5 per cent, while the Lorraine-Luxemburg production increased 15.5 per cent, and in 1905 constituted 32.0 per cent of the country's total instead of 28.0 per cent six years earlier.

In our own country the prospects are certainly very favorable. The trade has not yet felt the partial exhaustion of some of the older Lake Superior ranges. Last year, when the total output of the lake region broke all records by about 25 per cent, the Vermillion range turned out a tonnage which had been beaten on three previous occasions, while the Menominee's tonnage had been beaten once before. These ranges could have turned out more, but they are being conserved. The point is that these two ranges could go back and yet the Mesabi come forward with so large a gain as to bring the output of the whole region 25 per cent beyond its best previous performance. The full capabilities of Virginia and Alabama have not yet been shown and elsewhere in the country are large deposits which have not been exploited at all.

In other parts of the world there are deposits which are yet to be heard from in a commercial way. The known supply of iron ore in the world is a constantly increasing quantity, the ore discovered year by year being greater than the current consumption.

AMERICAN SHIPPING BILL.

Organization after organization is placing itself on record in favor of the pending shipping bill. Last week the Seattle Chamber of Commerce indorsed the bill and petitioned its representatives in congress to vote for its passage. The week before a couple of strong labor organizations in New York city did likewise; the same week the Builders' Exchange of Cleveland adopted strong resolutions in favor of the bill's passage. In the south evidences multiply of an increased interest in and desire for an American merchant marine.

The strongest commercial body in the city of Chicago, the Chicago Commercial Association, of which D. R. Forgan is president, and which has a membership running into the thousands—the organization that in a week raised a million dollars in Chicago for the relief of the San Francisco sufferers—last week adopted the following resolution:

"Whereas, There is now before the house of representatives a bill for the upbuilding of our deep sea marine; to promote the national defense; to create a naval reserve; to establish American ocean mail lines to foreign markets; and to generally promote commerce; said bill having passed the United State senate on Feb. 14, 1906. Now, therefore, be it

"Resolved, That we, the executive directors of the Chicago Commercial Association, of the city of Chicago, Ill., endorse the principles of said bill, and recommend an early passage."

The executive directors acted upon the recommendation of the ways and means committee of the organization, a committee with over a hundred members, which committee fully considered and then indorsed the bill.

Representatives in congress are hearing from their constituents by letter and telegram every day on this bill. It has been said that members of congress have received a great many appeals from steel makers and men engaged in the iron and steel business. These far-seeing business men realize that if the 5,000,000 tons of foreign shipping now engaged in our foreign carrying were supplanted with an equal tonnage of American ships during the next twenty years, there would be an expenditure in American ship yards of fully a billion of dollars.

The German iron ore production for the first quarter of 1906 amounted to 3,005,982 tons, reports Vice Consul-General Risdorf, from Frankfort. The production for the same period of 1905 was 2,334,590 tons.

INTERESTING POINTS

Concerning the Iron and Steel Trade of Great Britain.

The annual statistical report of the secretary of the British Iron Trade Association to its members, which will soon be issued, will contain a large amount of information. As to iron ores he states that the conditions for the United Kingdom in 1905 raise problems of unusual interest. The most important point is that in periods of specially good trade Great Britain is increasingly dependent on foreign ore supplies, local mines in 1905 having failed to provide more than 45 per cent of the total additional quantity required for the increased pig iron output of that year.

The most striking feature of the iron trade in 1905 has been the vast increase of production in almost every direction. Every leading iron-making country has published record breaking figures for both pig iron and steel. The colonial possessions of Great Britain, including India, are increasing their demands for iron and steel, but they appear resolved that, under existing conditions at any rate, they will make every effort to become entirely independent of outside supplies. This is especially true of Canada and Australia. The British exports of steel rails to Canada in 1905 were under those of the previous year, although there was an extraordinary drop in the exports of the United States.

For some years past there has been talk of the establishment of an iron industry in South Africa, and during the past year a company has been formed in Johannesburg for the manufacture of iron from scrap. This is a beginning, but it is likely to be some time before the industry can be carried much farther, as the population remains scant and is not largely increasing. The ship building industry of the United Kingdom enjoyed great prosperity during 1905, and has not only led the world again, but has gone beyond the supremacy achieved in previous years. The ship building industry has been the most important industrial source of home consumption, and in this respect Great Britain differs materially from both Germany and the United States, where railway demands count more than any other group of consuming interests. Ship building absorbed in 1905 over 1,500,000 tons of iron and steel in Great Britain, whereas in Germany it did not absorb more than 320,000 tons, and in the United States probably not more than 300,000 tons. On the other hand, the railways in the United States in the same year consumed for all purposes fully 5,500,000 tons of steel. The present railroad mileage of the United States is nearly ten times that of Great Britain.

Reports state that the competition which is now taking place between the tin plate manufacturers of South Wales and those of the United States is keener than it ever was before. It is likely to become more so in the future, inasmuch as the resources of production possessed by the United States are increasing to a greater extent than the increase of American demands for tin plates. For some considerable time past the American Sheet & Tin Plate Co. has been making unusual efforts to compete for the export trade in tin plates.

The influence of great organized industrial forces in steadying prices has been apparent both in the United States and in Germany during the past year. The Steel Corporation in the former country resisted the general tendency to unduly advance prices, and but for this action a greater advance, perhaps even reaching the dimensions of a runaway market, might have been apprehended. It has been much the same in Germany, where prices have not been raised beyond a reasonable level, having regard to the exceptional character of the conditions. In Great Britain the movement of pig iron prices has been affected by the speculative operations of bulls and bears to a larger extent than those of either of the other countries named.

Consul George C. Anderson, writing from Amoy, gives an interesting account of the very great difficulty in learning the multiplicity of dialects in China, and he holds that the study of Chinese for commercial purposes is unwise, unnecessary and unprofitable. The way to avoid the difficulty, is, he said, to employ Chinese and train them to speak English. He says that the intelligent Chinese are eager to learn English and the Chinese who can speak it can demand much higher wages than those who cannot. All over the nation schools are being established whose first requirement is the teaching of the English language. He predicts that English is the coming commercial language of China.

With reference to recent newspaper reports, wherein it was claimed that the German Steel Syndicate had declined an order for 100,000 tons of structural steel for San Francisco, the German consul general in New York, Mr. Karl Buenz, when questioned on the subject, made an emphatic denial.

IRON ORE DEPOSITS

Will be Investigated by Order of Canadian Government.

Toronto, Can., May 26.—As a result of the successful experiments recently made in electric smelting, the Canadian government on the recommendation of Dr. Eugene Haanel, superintendent of mines, has authorized an investigation of the iron ore deposits of Canada. The work, which will be commenced this summer, will be undertaken in three sections. F. Cirkel M. E., will have charge of the investigations in eastern Ontario and Quebec province; Mr. Shele M. E., will direct the work in western Ontario; and Nova Scotia is assigned to Prof. Woodman. Magnetic surveys will be made of the deposite of ore which appear to be most promising, and samples will be collected for analysis. In view of the inquiries concerning water power in the neighborhood of iron ore, and available for electric melting the investigation will include the ascertaining, wherever possible, of the approximate horsepowers of the water powers near ore deposits. Latterly there have been many inquiries from abroad as to Canadian iron ore deposits and the possibilities of electric smelting.

T. J. Drummond, vice president of the Lake Superior Corporation, states that the open-hearth steel plant will be in operation this fall. Its output will be from 250 to 300 tons daily, including tie bars, angle bars and general work. The company will not for the present engage in the manufacture of structural steel of a heavy character. The orders for steeel rails on hand will provide work in that line for at least ten months ahead.

Spain Increases Tariff.—A report from Consul-General Ridgely, of Barcelona, to the bureau of manufactures gives the rates of the new Spanish tariff, which will go into effect July 1 with duties payable in gold. American products are seriously affected, especially machinery. All along the line of machinery, electrical, agricultural and industrial as well as machine tools and nearly all manufactured articles the tariff is considerably increased. All foreign electrical machinery and devices under the new schedule will be subject to a duty of 19.3 cents per kilogram. Heavy machinery is advanced to $4.75 per 100 kilograms. On the other hand the discrimination against American sewing machines has been removed and American lubricating oil will be admitted at the rate of $9.65 per 100 kilograms which is the same rate now in force against the oil of all other countries.

TEN MILLION TONS

Will Be Shipped from the Mesabi Range.—Mining News.

(Special Correspondence.)

Virginia, Minn., May 29.—Ten million tons of ore are expected to be transported from Mesabi range mines to the docks at Duluth this season by the Steel Corporations's Duluth, Missabe & Northern road. This will be at the rate of about 1,300,000 tons a month, a record which gives emphasis to the fact that, in point of tonnage at least, the Missabe system is the greatest railway of its kind on the globe.

The company has this year purchased 1,000 new steel ore cars, each of 50 tons capacity, making 2,705 of this kind of rolling stock altogether, and in addition it has 2,300 of the old wooden type of ore cars. It has seventy locomotives, and it has recently purchased 200 forty-ton capacity flat cars, 50 forty-ton box cars, 25 refrigerator cars and eight more engines, in addition to new passenger equipment. The road is being double-tracked, which work is now nearly completed, and it is building a fourth ore dock at Duluth at a total cost of a million dollars. Last season the Missabe delivered 8,807,560 tons of ore to its docks at Duluth, and in 1904 it transported 4,650,000 tons, an amount which this year will be more than doubled.

Excellent progress is being made with the construction of the Missabe's fifty-five mile extension from Alborn, on the main line, to Bovey, on the western Mesabi; practically all the bridges are completed, much of the track is in place, and there is every probability that the first train will run into the western terminus of the new branch by the first day of July. It is adjacent to Bovey, from which the townsite was recently set apart, and on the shores of Trout lake, a large and well-shaped body of pure water, where the steel corporation's model city of Coleraine is being established. This town is already largely laid out. Streets are being opened, many having now been grubbed and ditched, and a large force of men is at work on Cole avenue, a continuation of the new county road leading from Bovey.

Although Coleraine will be the center of a comparatively small district, the existence of hundreds of millions of tons of ore in the immediate vicinity has already been determined, and as the diamond drills are continued in their mission the amount is steadily being increased. It is estimated that with the mines fully opened at least two and one-half million tons of ore will be produced annually. Much of this will come from open pits after many million yards of overburden have been removed from the ore deposits; the remainder, lying deeper, will be mined by the underground system, and in both cases, because of the presence of sand in quantity, it will doubtless be necessary to treat a considerable portion of the product by the washing process, adding to working forces and increasing mining costs. Shafts are sinking, costly plants of machinery are being installed and in general plans are being carried out for many years of large annual production.

Thousands of men, the best class of labor procurable, will ultimately be employed in the mines about Coleraine, and in the town now being built they will enjoy a model place of residence which in its advantages and environment is expected to go a long ways in solving the sociological problem and making of the miners and their families better citizens. A liberal policy has been adopted with reference to the sale of building lots, and further provision has been made to cover into the municipal treasury the proceeds of these sales, out of which will be met the cost of sewerage, water, and light systems and other improvements of public nature. The erection of buildings will not be permitted until the plans therefor have been approved by the company's engineering department, and speculation in realty within the city limits will be discouraged. Saloons will be permitted to flourish, but they will be limited in number and will be compelled to bow to certain restrictions with reference to closing hours and the sale of liquor itself. A start has been made on the construction of the school house, which it is understood will cost in the neighborhood of $75,000, and it is the reported intention of the company to erect a $40,000 office building.

It has been only within recent years that the presence of vast deposits of ore on the western Mesabi has actually been determined, and there is no question now that the formation extends across the Mississippi river for a considerable distance. Drills have been at work in this territory for some time past for the steel corporation and other interests, and while the ore thus far found is largely low in metallic iron, enough is already known of the country to assure that in years to come it will be the scene of important mining operations. Exploration has been difficult and of necessity has been conducted rather blindly for the reason that contrary to the case in other districts tributary to Lake Superior, outcroppings are lacking, drift covering the formation to such a depth as to obliterate surface indications of the presence of ore.

A scene of particular interest to the visitors to the Mesabi range is the great open pit of the Mountain Iron mine, the pioneer producer of the Minnesota fields and which, during the fourteen years of its career, has shipped upwards of 12,000,000 tons of ore, of which more than one-sixth was forwarded during the season of 1905. The average depth of the cut is 150 feet, but at one point the bottom of the huge excavation is 225 feet below the surrounding surface. The pit is in excess of half a mile in length and more than one-quarter of a mile in width. Rivaling this deep artificial valley is the big cut of the Mahoning mine in the Hibbing district. This covers an area of sixty-five acres, and immediately adjoining it on the south the steel corporation, at its Hull mine, has opened a pit which already covers twenty-five acres and is steadily being enlarged. From this latter cut a million tons of ore will be taken this season. Seven steam shovels will be employed there, and as many more on the Mahoning tract, probably the greatest concentration of the kind in the history of the range.

Another sight of particular interest is the monster grab system at the Grant mine of the Jones & Laughlin Steel Co. This is the largest ore stripping and hoisting apparatus of its kind ever devised, and if the results of its operation are as successful as anticipated similar installations are expected to be made at other properties on the Mesabi. The plant has been constructed with two towers, each about 175 feet high and 1,150 feet apart, between which stretch heavy lock cable wire ropes. The grab, which weighs about thirty tons, will carry approximately twenty tons of ore or twenty yards of gravel at a load. It is operated on four trucks, each of which is provided with four wheels that run on four 2¼-inch cables. As designed, the grab will pick up its load of ore or earth, as the case may be, will raise it to the proper height, convey it the specified distance and drop it into the waiting car, the entire operation being calculated to consume two minutes. The towers are erected on tracks and thus may be moved as occasion demands. The system is operated by electrical power.

The Detroit Steel Casting Co. has just placed a contract for a large addition to its present plant. The extension will be 125 x 180 feet, and will double the present capacity. Two basic open-hearth furnaces are up for sale.

The annealing and cleaning departments of plant 3 of the Spencer Wire Co., near Spencer, Mass., sustained a loss of $9,000 by fire May 27.

All but three of the steel corporation furnaces are in blast.

BENEFIT FUND GONE.

Heavy Demands Exhaust Strike Fund of Molders' Union.—The Labor Situation.

The molders' strike situation continues with little actual change, though developments of the week have made it clear that the position of the strikers will not be tenable much longer. The strike benefit fund of the union is practically gone. The reserve fund, the N. F. A. says it has discovered, has been wiped out, the present drain clearing out the small surplus left by the strikes of the past two and one-half years. Local unions are protesting vigorously against any increase in weekly dues, the only remaining resource of the national organization.

A settlement of difficulties in the St. Louis district is believed to be near at hand, mutual concessions being made, though the basis of agreement is generally favorable to employers. Foundrymen in many cities have posted notices of their intention to operate only on the "open shop" principle. At Toledo proper police protection has been denied working employes, although instances of open lawlessness were brought to the attention of the mayor. Foundrymen at Minneapolis, St. Paul and Boston are proceeding to operate with green help, and Beloit, Buffalo, Chicago, Scranton, Milwaukee and several other centers are making great progress in this direction.

Additional Demands.

In a number of centers demands have been formulated by the molders' union, but as yet no action has been taken. Among these districts are the following:

DAYTON, O. Union demands advance in wages of floor molders from $2.90 to $3.00, and bench molders from $2.65 to $2.75 and union agreement. Four hundred men probably involved. Foundrymen have refused to meet union officials.

NEWARK, N. J. Demands are for increase for coremakers to $3.00 and for molders to $3.25, beginning June 1, 1906, with a union agreement.

MONTREAL, QUE. Union demands that on and after May 7, 1906, wages of molders and coremakers shall be $3.00 and that all day workers shall be increased 20 per cent.

PLAINFIELD, N. J. Union demands a minimum rate of $3.00 for molders for a nine-hour day. Present rate $2.75. Demands to become operative June 1, 1906. Probable that further union demands will follow.

YOUNGSTOWN, O. The local molders' union has informed the foundrymen that it desires some changes in wages and other conditions in effect during the past year. Exactly what these changes are has not been stated. The matter, however, must be adjusted prior to June 30, 1906, as that is the date upon which the present arrangement expires. No action has as yet been taken.

SPRINGFIELD, O. Demands in this city are for an increase of 25 cents over present rates of $2.65 and $2.90 for bench and floor respectively, and for a reduction of hours from ten to nine; demands to go into effect June 1, 1906.

LAWRENCE, MASS. Local union demands an increase of 25 cents per day for all molders and coremakers to take effect June 4, 1906.

COLUMBUS, O. Union demands a reduction in hours from ten to nine, and increase for molders from $2.85 to $3.00 and for coremakers from $2.50 to $2.75.

HOLYOKE, MASS. Union demands minimum for molders and coremakers of $2.75 for nine hours, with overtime and double time.

PORTLAND, ME. Union demands minimum of $2.75 and nine-hour day, time and half for overtime and double time for holidays, recognition of the union and a closed shop agreement.

Pittsburg Mass Meeting.

The mass meeting called by Pittsburg employing foundrymen who are members of the National Founders' Association, to which all molders and coremakers of the Pittsburg district were invited for the purpose of discussing the wage question and jointly considering the demands which have been made upon the employers, was held at the Alvin theater, Pittsburg, last Sunday afternoon. Aside from presenting an opportunity to place before the molders and coremakers the side of the employers, however, it was not particularly productive of results, inasmuch as the representatives of the union refused to discuss the proposition under these conditions.

President I. W. Frank, of the United Engineering & Foundry Co., explained to those assembled the position of the employing foundrymen and stated that the object of the gathering was to meet the molders and coremakers as a body of individuals instead of their representatives, the conference board. He said the foundrymen would treat only with their employes, that the members of the union conference board were not such employes. The employers, he stated, did not object to paying molders the wages they asked, provided they gave in return an equivalent in work, removed the output limit and made it possible to allow workmen to be paid according to their ability and skill; not to class all molders under the same head, and make it compulsory to the employer to pay good and bad workmen the same scale, irrespective of their work or ability.

General Manager W. H. McFadden, of Mackintosh, Hemphill & Co., followed Mr. Frank, saying that Pittsburg foundrymen were now the leaders in paying high wages to artisans and that the firm he represented was willing to pay as high as $4 per day to skilled molders as individuals, with the provision that they give an equivalent in output. He also asked that the scale at other competitive points was brought up to an equality. He explained that 90 per cent of the work done in Pittsburg was shipped to competitive points, and that Cleveland, Erie, Cincinnati, Youngstown and Philadelphia now had an advantage in wage scales which often enabled manufacturers at those points to accept work at prices which were actual cost to Pittsburg manufacturers and still make a profit, and all on account of the cost of labor, as material prices were the same.

Representative Manning of the molders' union refused to discuss wages or conditions at the meeting, and an adjournment was taken without any joint action, the manufacturers asking the molders and coremakers seriously to consider the propositions put to them before they went further with their demands. The attendance at the meeting was small, several of the Pittsburg lodges of molders having instructed their members not to attend.

Long Strike Ended.

After almost a year and a half of idleness the Wheeling and Martin's Ferry plant of the Whitaker Glessner Co. will resume operation, the strike called in February, 1905, having been settled between that company and the officers of the amalgamated association. This action was a recognition of the claims of the company to the effect that the U. S. steel corporation was given an advantage in the sheet department.

Bar Iron Conference.

The Amalgamated Association of Iron, Steel & Tin Workers has arranged with the Western Bar Iron Association for a conference on the iron wage scale, the meeting to be held in Detroit, on Thursday of this week. The conference with the Republic Iron & Steel Co. has not yet been arranged.

Going to Cleveland.—The Pittsburg Foundrymen's Association on Monday night of the present week decided to attend the Cleveland convention of the American Foundrymen's Association, leaving Pittsburg by special car Tuesday morning June 5 at 8:15, via the Pittsburg & Lake Erie and Erie railroads. This meeting was the last to be held by the Pittsburg association before September, when the regular monthly sessions will be resumed.

PERSONALS.

O. O. Laudig has resigned as superintendent of the blast furnaces of the International Harvester Co., Chicago.

A. C. Hayden, representing the Carnegie Steel Co., recently appeared before the house committee on labor to speak against the enactment of the eight-hour bill.

Chas. H. Pratt, advertising manager for the Western Tube Co., Kewanee, Ill., has resigned to locate in Chicago, where he will engage in business as an export sales agent.

William Lodge, of the Lodge & Shipley Machine Tool Co., Cincinnati, is confined to his home as the result of being thrown from a buggy. His injuries, however, are not serious.

S. W. Robinson has been chosen president of the Jessop Steel Co. to succeed Wm. Jessop, who died recently. W. F. Wagner was chosen vice president and E. L. Hand and C. N. Brady were made directors.

Roderick MacCorquodale, manager of the Oswego plant of the Railway Steel Spring Co., has been transferred to the York office. He is succeeded by W. J. Golden, who has been connected with the company for some time.

James F. Merritt, formerly foreman of the steel casting department of the Birdsboro Foundry & Machine Co., has resigned to accept the superintendency of the Federal Steel & Iron Co., Chester, Pa.

S. P. Mitchell, chief engineer in charge of erection for the American Bridge Co., has resigned, effective June 1. The office has been abolished and the new position of general manager of erection, which has been created instead, will be filled by H. F. Lofland.

Thomas Beatty, superintendent of the skelp and Bessemer mills of the Riverside department of the National Tube Co., Benwood, W. Va., will succeed Frank H. Crockard as general manager. The latter has assumed his new duties in connection with the Republic Iron & Steel Co. and the Tennessee Coal, Iron & Railroad Co.

Chauncey Keep has been elected a director of the Pullman Co., succeeding the late Marshall Field. No other transactions of the annual meeting were announced, but earnings for the year are reported to be the largest on record. President Lincoln some time ago denied the report that the company contemplated the construction of steel cars.

William K. Bixby, chairman of the executive committee of the American Car & Foundry Co., has given it out that he will resign at the annual meeting of the board of directors in New York next month. Mr. Bixby says that he accepted the position six years ago with the distinct understanding that he was to hold it only until he could complete the work of organization, of bringing about harmonious relations between the numerous plants of the corporation. This has been done now, and he feels that he would prefer to retire and look after his other interests. Mr. Bixby is a comparatively young man, being now in his forty-ninth year.

Henry F. Vogel has resigned as vice president and general manager of the St. Louis Car Co., thereby causing several changes in the corporation. W. S. McCall, general sales agent, has been promoted to vice president; A. H. Sisson, assistant general manager, becomes general manager; and Walter S. Miller, superintendent of tools and machinery, becomes manager of works. Mr. Miller also becomes manager of the automobile department, more properly termed the Kobusch Automobile Co. The company is building a steel car factory in its yards in North St. Louis with a capacity of ten cars with sidetracks for material. The factory will be equipped with two 10-ton traveling cranes operated by electricity. Though unfinished, the shops are being used now, owing to the rush of work.

John F. Taylor, vice president and treasurer of the Republic Iron & Steel Co., resigned at a special meeting of directors held in New York last week, and his duties were assumed by H. L. Rownd, secretary of the company. W. H. Hassiner, vice president and general manager, resigned to look after private interests, and his duties were taken over by Frank H. Crockard, recently chosen vice president and general manager of the Tennessee company. G. Watson French and A. H. Huston, vice presidents, also resigned. A readjustment of the selling arrangements of the Tennessee and Republic companies in charge of S. V. Kerr and F. A. Burr was made. W. L. Klutz, for two years assistant superintendent of the Ensley furnace plant, has been appointed superintendent of the Alice furnace at Birmingham. Warner Shook, blast furnace superintendent at Ensley for the Tennessee company, has been made general manager of the Central Iron & Coal Co.

Terminals Granted.—After weeks of inaction the St. Louis house of delegates has passed the bill permitting the American Car & Foundry Co. terminal privileges in South St. Louis and it is stated that work will begin soon on the new million dollar plant. There was talk of taking the plant to Madison Ill., and Indianapolis, and it is believed this hurried favorable action by the house.

THE COKE MARKET.

Uniontown, Pa., May 26.—The conditions in the Connellsville region today are very little different from last week. Standard furnace coke is still very scarce and it is selling at $2.50 to $2.60, and very little to be had at any figure, as the operations which produce this grade have sold all that they can produce before July 1. It is not exactly the same with 72-hour foundry coke, as there seems to be very little activity along this line and prices are ranging from $2.85 to $3.00 to the consumers, which shows that there is not the difference in price that there should be. Second grade furnace coke is a little dull this week. The operators have been fearful as to the prospects of a good summer. Prices on this grade are ranging from $1.75 to $2.00.

All the railroads are ready to meet the demands of the operators for any kind of equipment and all freight is being moved in good time. The operators are talking $2.50 for standard furnace coke for the last six months, and $3.00 for foundry. The American Smelting & Refining Co. has been making large purchases of second grade furnace coke for export to Mexico via. boat from Baltimore, which kept the price up last week. All available ovens are going and the new ovens are being fired up as quickly as possible. About 4,000 new ovens are to be built this spring and summer.

BUILDING TRADES ALLIANCE.

The conference of the Structural Building Trades Alliance of America which was in session in St. Louis all last week, adjourned Saturday to meet next year in Norfolk, Va. New officers were elected as follows: James Kirby, Chicago, president; Jacob Tazelaar, Minneapolis, first vice president; Herman Lilien, Chicago, second vice president, and William J. Spencer of Dayton, Ohio, secretary and treasurer. The board of governors consists of James Hannahan of Chicago; H. H. Roach of Allegheny, Pa., and William McSorley of Cleveland

At a rehearing of the request to issue a charter to the building trades council of Boston it was decided to issue the charter provided the request was made in the proper manner. A resolution was adopted asking President Roosevelt to insist upon a fair trial of Moyer, Pettibone, Hayward and St. John, under indictment in connection with the assassination of Governor Stuenenburg of Idaho.

The E. H. Brown Co., incorporated with a capital stock of $75,000 in Massachusetts, will manufacture and sell steam engines. The officers are: President, Walter F. Brown, Boston; treasurer and clerk, William L. Lorgentz, Fitchburg, Mass.

Prices Advance In Irregular Market.

The stock market of the past week was irregular and changes were far from uniform, but industrial securities generally recorded advances, in some instances of several points. The market opened exceedingly weak and though call money was easy transactions for Monday were the smallest for any full day of the year. Improvement set in, however, and the climax came on Friday when sales totaled over 1,100,000 shares. News developments of the week bearing on the financial situation were numerous. There was an easier tone to the money market, following the report that the Pennsylvania had borrowed from $25,000,000 to $50,000,000 in Paris and the rumor that certain fire insurance companies were negotiating a joint loan of $25,000,000 in the same market. The resumption of banking operations in San Francisco was also watched with wide interest though it was not complete, owing to the continuance of the practice of declaring each day a legal holiday, thus preventing the presentation of notes for collection. In the industrial field leading copper stocks declared increased dividends and the estimate of THE IRON TRADE REVIEW that 1,000,000 tons of steel rails had already been sold for 1907 delivery was taken as a guarantee of the continuance of present activities in iron and steel. The situation was further strengthened by the announcement of the Steel Corporation that it had in contemplation no bond issue in connection with the building of its new plant at Gary, Ind. The Pennsylvania railroad was in the limelight all the week, and on Tuesday declined to the lowest point in more than a year, 131⅛. Reading enjoyed wide favor and advanced over seven points on total transactions of practically 1,000,000 shares, more than one-fourth of the week's trading. Steel Corporation sales were only about 200,000 shares, American Locomotive 44,000, Colorado Fuel & Iron 85,000, and other industrial securities were inactive.

THE LEADING INDUSTRIAL SECURITIES.

	Closing Quo. May 19	Closing Quotation May 26	Changes	Date of 1906 Ann. Meet.	Par Value	Capital Outstanding	Dividend Basis	Dividend Being Paid	Dividend Date Last Div. Dec.
Allis-Chalmers Co	20¾	21	+ ¼	Sept.	100	19,820,000	.....	.....	.....
Allis-Chalmers preferred	55¾	57½	+1¾		100	16,150,000	7 cum	.....	Feb., 1904
American Can	7⅞	7⅛	− ⅜	Apr. 24	100	41,233,300		5 Q.	.....
American Can preferred	63	62	−1		100	41,233,300	7 cum	.....	Apr., 1906
American Car and Foundry	41	40¾	− ¼	June 28	100	30,000,000		7 Q.	May, 1905
AmericanCar and Foundry preferred	101	100½	− ½		100	30,000,000	7 n. c.	.....	Jan., 1906
American Locomotive	69¼	69	− ¼	Oct. 16	100	25,000,000		7 Q.	
American Locomotive preferred	115	114⅛	− ⅛		100	24,100,000	7 cum	4 Q.	Apr. 1906
American Shipbuilding	56	57	+1	Oct. 2	100	7,600,000	4	7 Q.	Apr., 1906
American Shipbuilding preferred	105	105	.....		100	7,900,000	7 n. c.	.....	Jan., 1906
American Steel Foundries	10¾	10⅝	− ⅛	Oct. 3	100	17,700,000		.....	
American Steel Foundries preferred	44⅛	44½	.....		100	17,700,000	6 cum	.....	Aug., 1905
Barney & Smith	65	65	.....	June 5	100	1,000,000		8 Q.	June, 1894
Barney & Smith preferred	140	140	.....		100	2,500,000	8 cum	.....	Mch., 1906
Bethlehem Steel	27¼	29¼	+2	April 3	100	15,000,000		7 Q.	
Bethlehem Steel preferred	87⅛	89¼	+1⅞		100	15,000,000	7 n. c.	6 Q.	May, 1906
Bullock Electric preferred	111	111	.....	Oct. 2	100	1,000,000	6	7 Q.	Jan., 1906
Cambria Steel	34½	34¾	+ ¼	March 20	50	45,000,000	6	4 S. A.	Mar., 1906
Cambria Iron	49½	49½	.....		50	8,468,000	4	.....	Apr., 1906
Colorado Fuel & Iron	50¾	54	+3¼	Oct. 15	100	30,132,000	7	.....	Apr., 1902
Wm. Cramp & Sons Ship & Eng. Bldg. Co.	20	22	+2	May 31	100	6,098,000	5	.....	Nov., 1902
Crucible Steel	13⅝	15⅛	− ½	Oct. 17	100	25,000,000		.....	
Crucible Steel preferred	80	79⅞	− ⅛		100	25,000,000	7 cum	.....	Sept. 1903
Empire Steel	5	5	.....	Feb. 28	100	2,281,400		3 S. A.	
Empire Steel preferred	36	36	.....		100	2,500,000	6 cum	5 Q.	Jan., 1905
Fay & Egan	93½	93½	.....	Feb. 20	100	1,000,000	5	7 Q.	Nov., 1905
Fay & Egan preferred	128½	128½	.....		100	1,000,000	7 cum	8 Q.	Nov., 1905
General Electric	168¾	167½	−1¼	May 8	100	48,256,050	8	2	Jan., 1906
International Pump	52¼	55	+2¾	June 5	100	12,262,500		6 Q.	July, 1905
International Pump preferred	90¾	89⅞	+ ⅞		100	8,85.,000	6 cum	.....	May, 1906
Lackawanna Steel	71	71	.....	March 14	100	34,971,400		.....	
Lake Superior Corporation	19	18½	− ½	Oct. 3	100	40,000,000		6 Q.	
Niles-Bement-Pond	130	130	.....	Feb. 7	100	5,000,000	6	6 Q.	May, 1906
Niles-Bement-Pond preferred	105	105	.....		100	2,000,000	6 cum	2 A.	Mch., 1906
Otis Elevator Co	53	53	.....	March 19	100	6,350,300		6 Q.	Apr., 1906
Otis Elevator Co. preferred	100	100	.....		100	5,589,500	6 n. c.	.....	Apr., 1905
Pittsburg Coal Co	14½	13⅜	− ⅜	Feb. 12	100	30,135,000		.....	
Pittsburg Coal preferred	54¾	54	− ¾		100	30,716,200	7	3	Apr., 1905
Pressed Steel Car	51¼	51	− ⅛	Feb. 21	100	12,500,000		7 Q.	Aug., 1904
Pressed Steel Car preferred	97⅞	97½	− ⅜		100	12,500,000	7 n. c.	8 Q.	May, 1906
Pullman Palace Car	225	230	+5	Oct. 18	100	74,000,000		4 S. A.	Feb., 1906
Railway Steel Spring	52⅛	52	− ⅛	March 1	100	13,500,000		7 Q.	Oct., 1905
Railway Steel Spring preferred	102½	102½	.....		100	13,500,000	7 cum	.....	June, 1906
Republic Iron & Steel	28¾	27¾	− ⅞	Oct. 17	100	27,352,000		7 Q.	
Republic Iron & Steel preferred	101½	103	+1½		100	20,852,000	7 cum	5	Apr., 1906
Sloss-Sheffield	79½	79¾	+ ¼	March 14	100	7,500,000	5	7 Q.	Jan., 1906
Sloss-Sheffield preferred	110	110	.....		100	6,700,000	7 n. c.	4 Q.	Jan., 1906
Tennessee Coal & Iron	147½	151¾	+5¼	May 15	100	22,552,800		2	Apr., 1906
U. S. Cast Iron Pipe & Foundry	48	51⅞	+3⅞	June 27	100	12,500,000		7	June, 1906
U. S. Cast Iron Pipe & Foundry preferred	93¼	94	+ ¾		100	12,500,000	7 n. c.	.....	June, 1906
U. S. Steel	40⅞	40⅜	− ½	April 16	100	508,302,500		7 Q.	Dec., 1903
U. S. Steel preferred	105⅞	105½	− ⅜		100	360,281,100	7 cum	5 A.	Feb., 1905
U. S. Steel 5's	97⅜	98¼	+1⅛		100	463,798,000	5	.....	
Virginia Iron, Coal & Coke	42	43	+1	Sept. 18	100	8,641,600		10 Q.	
Westinghouse Electric	154	158	+4	June 27	50	20,996,350	10	20 Q.	Apr., 1906
Westinghouse Air Brake	148	148	.....	Oct. 2	50	10,990,450	20		Apr., 1906

FINANCIAL NOTES.

Recent dividend declarations include the following: Railway Steel Spring Co., regular quarterly, 1¾ per cent on preferred, payable June 20; Buffalo & Susquehanna, 15 per cent; American Brake Shoe & Fdy. Co., regular quarterly, 1¾ per cent on preferred and one per cent on common, payable July 2.

It is officially announced that the Lake Superior Corporation, besides meeting the interest on the ordinary bonds, will pay the interest on the incoming bonds when it falls due in a few months.

The Shelby Iron & Steel Co., in its annual report for 1905, shows profits of $46,950, a slight increase over the previous year, but small as compared with the two years preceding.

The so-called "free alcohol bill" has passed the senate and the house promptly concurred to the amendments which were not material.

VOLUME AND TEMPERATURE CHANGES DURING THE COOLING OF CAST IRON.[1]

BY THOMAS TURNER.

As the changes which take place during the solidification and cooling of cast iron are of great practical and theoretical importance, it appeared advisable that further study should be made with accurate apparatus and typical materials. For this purpose a special and simplified form of apparatus was designed in order to measure the changes of length of the test-bar, while cooling curves were taken of the specimens at the same time by means of the Le Chatelier pyrometer.

The form of apparatus ultimately adopted by the author, after various trials, may be described as consisting of three portions: (a) the mold with

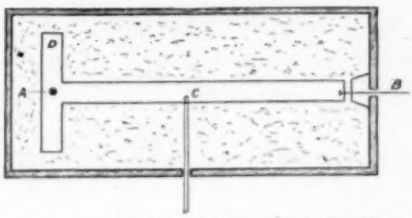

FIG. 1.—PLAN OF LOWER HALF OF MOLD.

A—Fixed vertical pin. B—Movable horizontal pin. C—Thermo couple. D—Position of Gate.

the test-bar, (b) an arrangement for indicating changes of length in the bar, and (c) the pyrometer. The experiment was that of casting a bar in a sand mold; keeping one end of the bar fixed, and noting the alterations in position of the other end, which was left free to move. At the same time a thermo-couple was introduced into the mold so as to indicate the temperature.

The form of test-piece and method of working will be understood from Fig. 1, in which is given a plan of the lower half of the sand mold, with everything in place for receiving the metal. In order to insure that the one end of the bar does not move, the casting is made in a "T" form; and, to make assurance doubly sure, a short steel pin enters vertically at A, and is clamped above to the end of the iron box containing the mold. The metal solidifies round this pin as it cools, so the movement at this end is prevented. At the other end a thin fin of sand is left, just sufficient to prevent the flow of the metal when fluid, but not enough to appreciably interfere with the free movement of a solid bar. Passing through this fin in a horizontal direction, and continuous with the center of the bar, is a metal pin which, as a matter of fact, consists of a wire nail, as the head is of a convenient shape and size for the purpose. The bar is ½ inch in square section, and exactly 12 inches in length from the cross-piece to the head of the nail, and when the metal is poured into the mold it surrounds the head of the nail, which thus becomes firmly embedded. It is, however, quite free to move, with the bar, in a horizontal direction, and its outer end is attached to the indicating apparatus or extensiometer.

The special form of extensiometer designed for these experiments is shown in Fig. 2. It consists of a brass pointer 28 inches long, which is supported so that it swings freely, but it is kept at rest in a vertical position by the weight W, except when it is deflected during the progress of an observation. The weight insures that the pointer shall follow the slightest movement of the test-bar, whether positive or negative. In the apparatus actually employed the movement of the end of the bar was multiplied about forty-fold, but that is a detail which could obviously be varied at will. As a matter of fact, our instrument was provided with two attachments giving different magnifications, but a forty-fold increase was on the average, found most convenient for the present series of tests, and with this apparatus.

The pyrometer used was the ordinary Le Chatelier thermo-couple, which was placed bare in the mold so as to be in actual contact with the metal, and the scale divisions from the beam of the galvanometer mirror were read by the eye. For each experiment, therefore, three persons, at least, were necessary: one to record the readings of the extensiometer, another to read the pyrometer scale, and a third to pour the metal into the mold, and give the signal to start observing. Time signals were given by hand-tapping each five seconds during the early part of each experiment, the intervals being later increased to ten seconds, and ultimately to twenty or thirty seconds as the metal cooled. We were thus able to insure the absolute agreement in time of the expansion and cooling curves which could not otherwise be so readily obtained.

It will be seen from an examination of the accompanying diagrams that the curves obtained may be divided into four classes, depending upon the number of arrests which are observed in the normal rate of contraction of a cooling solid. The curves given may be regarded as being typical, but a large number of observations have been made with various metals and alloys. The actual shape or slope of curve obtained from a particular material will depend to some extent upon the rate of cooling, and this is affected by the pouring temperature, the size of the bar, and the condition of the mold. But though the curve may thus differ in form, within certain limits, the type always remains the same for similar materials, and it is possible, at a glance, to distinguish the type to which the metal belongs. These types are represented in Fig. 3.

1. In the first class of material the contraction curve is uniform, and there is no arrest in the decrease of

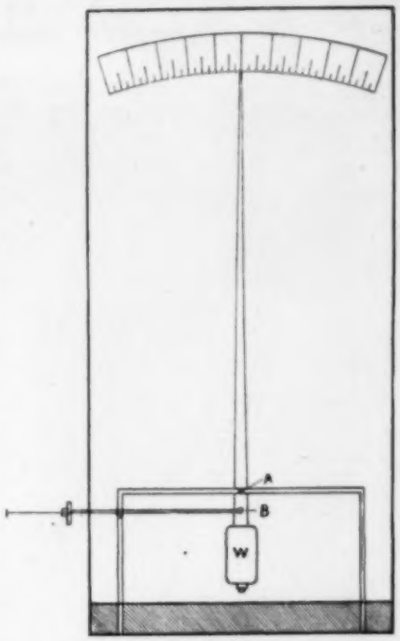

FIG. 2.—EXTENSIOMETER.

volume as the metal cools. This is represented in the lowest curve on the diagram, viz., that given by pure electrolytic copper. Aluminum, antimony, lead, tin and zinc yield curves of this type. Mr. Simpson has also found that the alloys of zinc and aluminum belong to this class, though it has been stated that alloys of this series expand during solidification. It is proposed to publish the results of these researches in due course.

2. The second class of curve affords indications of one retardation during contraction, which may or may not lead to an actual expansion. White iron is a typical example of this class, to which also (as Mr. Keep has shown) high carbon steel belongs.

3. The third type of curve indicates that two arrests have occurred in the rate of contraction, and non-phosphoric gray cast iron furnishes an excellent example of this class. Gray hematite gives two marked expansions, one occurring immediately after

[1] Abstract of a paper presented at the London (May 1906) meeting of the Iron & Steel Institute.

the metal has become sufficiently solid to cause the indicator to move, and the other after an interval of nearly three minutes, when a ½-inch square test-bar is employed.

4. The last class of curve is represented at the top of the diagram, and in this three distinct arrests occur. A very gray phosphoric pig iron gives the most characteristic curve of this type. The second expansion is relatively small in amount, and though the first expansion is large, it is not so very pronounced as the third expansion; while, as a result of the three taken together, no less than four minutes and thirty-five seconds after solidification has elapsed with a ½-inch square bar, before it has again reached the original size of the mold, after which contraction proceeds regularly to the atmospheric temperature.

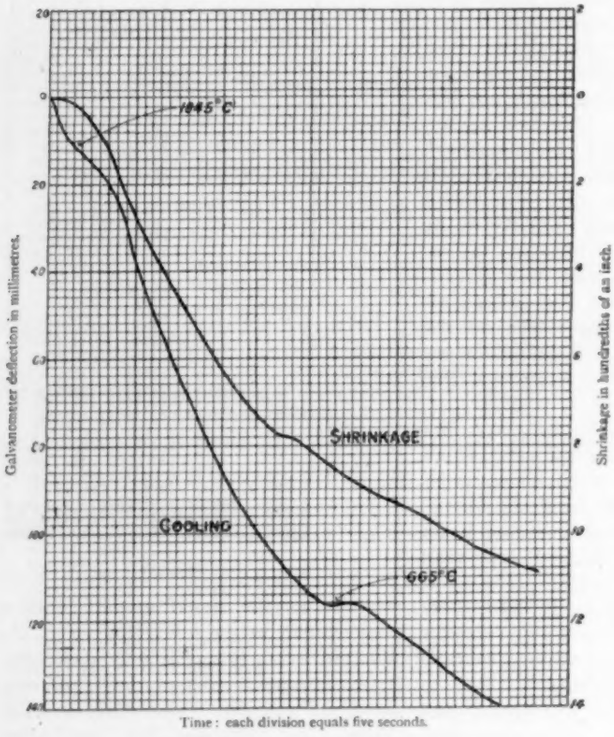

FIG. 3.—PURE WHITE IRON.

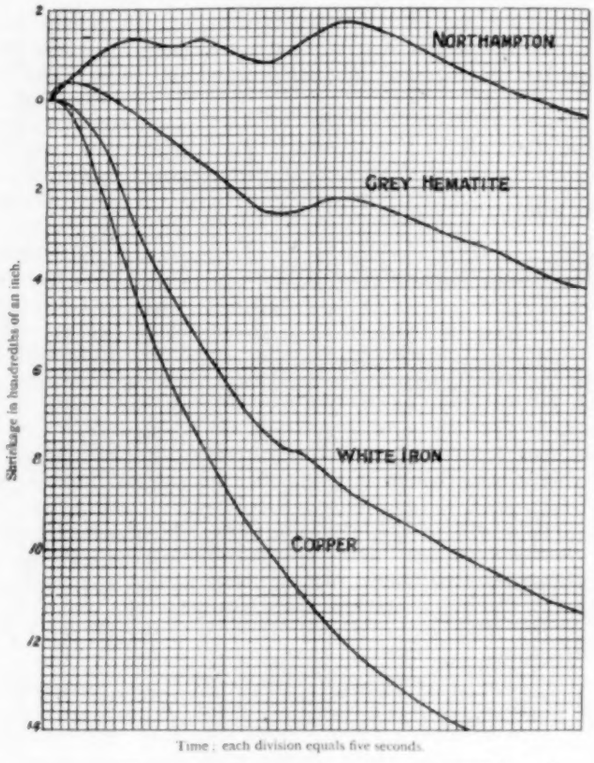

FIG. 4.—TYPES OF CONTRACTION CURVES.

It is now proposed to give particulars of the contraction and temperature changes of a few characteristic examples. For this purpose the following materials were selected.

1. *Pure White Cast Iron.*—The tests were performed on a sample of "American washed iron" which is kept as a base for tests of the influence of various elements. It consists of practically pure iron, with about three per cent of combined carbon.

2. *Non-Phosphoric Gray Iron.*—For this purpose a No. 3 hematite pig was employed: it was part of the stock used for steel melting in the open-hearth furnace in the smelting laboratories of the university. It was somewhat higher in silicon than usual, but this was not in any way an objection for the purposes of these tests.

3. *Phosphoric Gray Iron.*—The sample tested was a No. 1 Northampton (Islip) iron, such as is used for the production of very gray or fluid castings.

4. *Close-Grained Good Foundry Iron.*—This metal was from a broken-up casting; it was soft and gray, and would give good results for general purposes, so long as the cooling was not too slow.

The composition of these materials was as follows:

	White Iron	Gray Hematite	Northampton	Cast Iron
Carbon combined	2.73	0.86	0.15	0.79
" graphitic	....	2.53	2.00	2.73
Silicon	0.01	3.47	3.98	1.41
Sulphur	trace	0.05	0.03	0.07
Phosphorus	0.01	0.04	1.25	0.96
Manganese	trace	0.55	0.50	0.43

In each case melting was carefully performed in a covered Stourbridge fire clay crucible, some charcoal being placed in the crucible with the charge to prevent loss by oxidation. The large number of separate test-bars were not afterwards separately analyzed, as considerable experience with this class of test has shown that the changes which take place in such material under these circumstances are practically negligible. The range of temperature covering the melting-points of the metals and alloys examined in the progress of this research was upwards of 1,000 degrees C., so that no uniformity of pouring temperature was possible. In each case the object was to pour the metal at a heat which would insure the mold being completely filled and allow solidification to begin within a few seconds after pouring. The head of metal was about two inches, but the depth of the depression in the head varied very much, according to the shrinkage of samples.

An examination of the shrinkage and cooling curves for white iron, given in Fig. 4, shows only one well-marked retardation in each curve at about two and a half minutes after pouring, the temperature being about 665 degrees C. There is also a lag in both curves during the first twenty seconds; this lag is probably due to the well known pasty stage through which white iron passes when solidifying. In the case of white iron there is no actual expansion at any temperature during cooling; the rate of contraction is sharp, and the shape of the curve very nearly that of a normal metal such as lead, tin or copper.

The curves for non-phosphoric gray pig iron, given in Fig. 5 show, on the other hand, two actual expansions during cooling, and each expansion is accompanied by a distinct rise in temperature. The first of these retardations

occurs about fifteen seconds after solidification has commenced, and with a temperature of about 1,135 degrees C. (the readings taken varying from 1,120 to 1,150 degrees C.); while the second arrest takes place some two and a half minutes later, and at a temperature of 695 degrees C.

It may be added that the exact temperature of the first arrest is difficult to observe owing to the rapidity of cooling and the short interval of time over which it extends.

The phosphoric gray pig iron, of which contraction and cooling curves are given in Fig. 6 has three actual expansions during cooling and three corresponding retardations in the cooling curve, though these do not appear to give actual rises in temperature. The first arrest reaches its maximum after about twenty to thirty seconds, and at a temperature of 1,060 degrees C.; the second occurs after about one and a half minute, and at a temperature of 900 degrees C.; while the third is very marked and long continued, beginning about two minutes after solidification and lasting for about 160 seconds, the temperature arrest being at 730 degrees C. The results may be summarized as in Table II.: temperatures being in Centi-grade degrees:

TABLE II.

	Iron Containing		
	Carbon only	Carbon and Silicon	Carbon Phosphorus and Silicon
First arrest..	Almost absent	At 1135°	At 1000°
Second arrest	Absent	Absent	At 900°
Third arrest..	At 665°	At 695°	At 730°

It must not be supposed that only sharp and definite curves of the three types given are met with when dealing with cast iron in everyday practice. Pig irons or foundry mixtures differ widely in composition, and in consequence all kinds of curves are obtained, from Fig. 4 on the one hand to Fig. 6 on the other. The cooling and contraction curves of a soft close-grained iron, of which the composition has already been given, will be found on Fig. 7. In this it will be noted that the three retardations in the cooling curve are distinctly indicated, while in the contraction curve the first and third expansions are plainly seen; but the second expansion is faint, and might even be overlooked. Its presence becomes quite evident, however, if a straight-edge be applied to the curve, or if the curve be carefully compared with that given by non-phosphoric iron.

An intermediate small retardation, previously recorded by Mr. Hudson, with slowly cooling Northampton iron at about 850 degrees, is not observed in these experiments, probably owing to the more rapid rate of cooling. As the records were not taken below about 750 degrees in the previous experiments, the third retardation was not reached. The remarkable point about this third expansion is the low temperature at which it takes place, when its volume and duration are considered.

In the absence of silicon the change of volume is very small and the temperature 665 degrees C.; with intermediate silicon the expansion becomes marked, and occurs at about 695 degrees C.; with about four per cent of silicon the expansion becomes very large indeed, and takes place at about 730 degrees C. Although this expansion takes place at about the temperature of pearlite formation, it cannot be due to this cause, since white iron contains more pearlite than very gray iron, yet the expansion noted with white iron is relatively quite negligible. The presence of silicon leads to an expansion which takes place at a higher temperature and to a vastly increased amount. If it be assumed that coarse-grained or flaky graphite separates during the first expansion, as there appears every reason to believe, then the question arises whether the third expansion is not due to the separation of temper carbon, from, or instead of, pearlite, under the influence of silicon. Professor Lodin has recalled the fact that Forquignon in 1881 mentioned the segregation of carbon from carburetted iron annealed at relatively low temperatures. According to Wüst and Geiger, temper carbon results from the decomposition of carbide, which forms in small quantities on heating white iron even to low temperatures. The

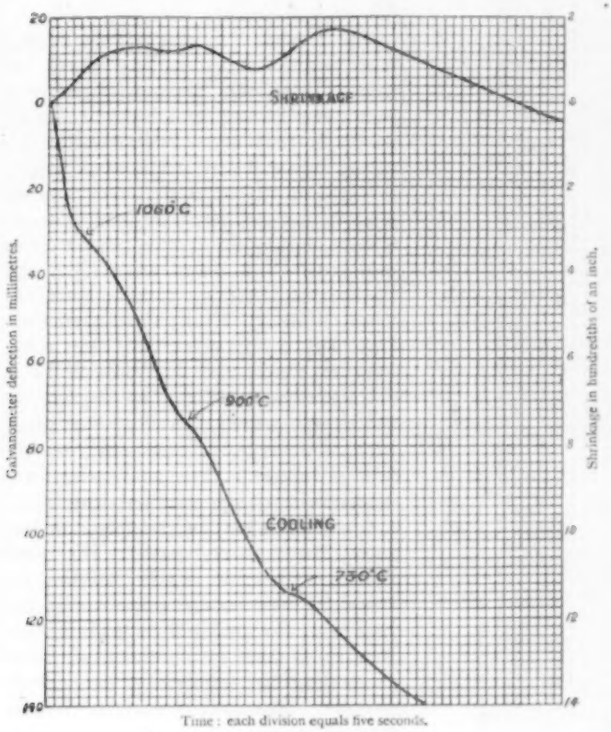

FIG. 5.—GRAY HEMATITE IRON.

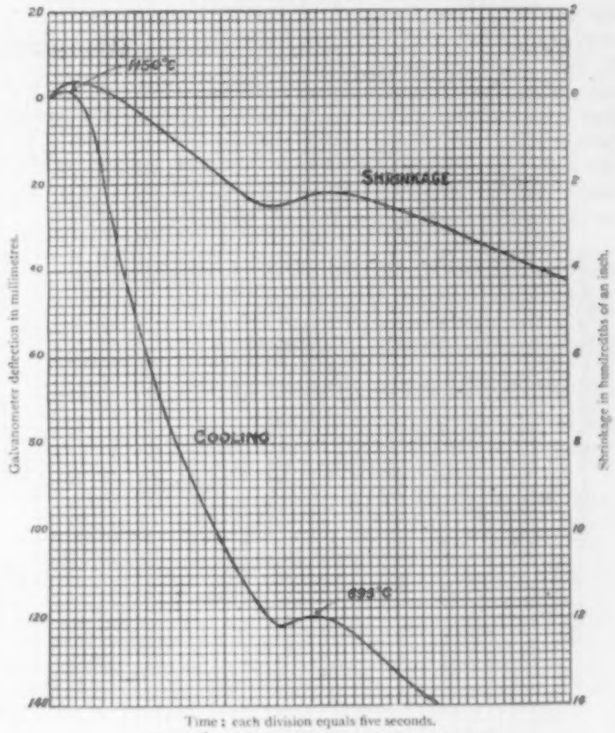

FIG. 6.—GRAY NORTHAMPTON IRON.

main quantity is, however, formed suddenly as soon as a certain temperature is reached; this temperature depends on the quantities of other substances which are present in the iron. The temperature which is usually regarded as best for the production of temper carbon from white iron is about 900 degrees C., though Charpy and Grenet have shown that by heating white iron to 700 degrees C. for only a few hours, seven-eights of the combined carbon was decomposed. But if, as suggested by Heyn, iron carbon alloys above 700 degrees C. are in a metastable condition, which silicon tends to render more stable, the stable condition being that of ferrite and graphite, then it will be evident that each addition of silicon will cause the separation of graphite (in the form of temper carbon) to take place more readily from a cooling mass of cast iron; or, in other words, at a higher temperature. If temper carbon is not separated at this third retardation, or at a temperature of about 700 degrees C., it is difficult to account for the marked expansion which occurs. It may be noted that white iron castings are known to increase distinctly in volume during annealing, due, doubtless, to the separation of temper graphite.

In conclusion, it may be pointed out that the observation of the changes of volume which take place during the solidification and subsequent cooling of cast iron affords the ironfounder a ready means of checking and controlling his foundry mixtures. The apparatus is such as can be made by any intelligent mechanic; the actual observation does not require any special skill, and can be completed in about twenty minutes; while the curves when intelligently interpreted afford information as to the chemical composition, the hardness, and the strength of the metal which is, so far as I am aware, supplied by no other single test. These curves should also settle for ever the old controversy as to which metals, if any, expand during solidification, and why in certain cases a piece of cast iron, or other metal, will float on the surface of a molten bath of the same material.

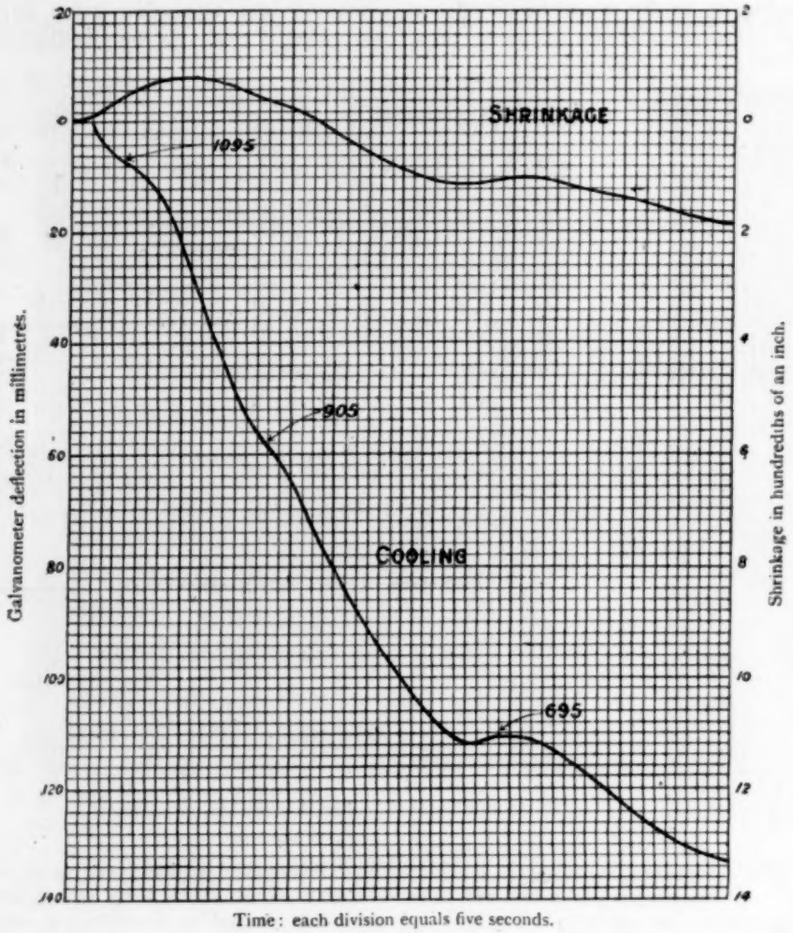

FIG. 7.—FOUNDRY CASTING.

EFFECT OF A BLOW.[1]

BY ALEXANDER W. MOSELEY,[2] AND JOHN LORD BACON.[3]

Power and steam hammers are ordinarily rated by the weight of the moving parts. The weight and shape of the anvil, foundation, frame, anvil block and hammer block, in fact, the design of the hammer in almost every detail as well as the weight and shape of the hammer, rod and piston, the steam pressure on both sides of the piston, and the amount of drop enter into the effect of the blow.

The effect of a blow is the measure of what a blow does to the piece and the change in form of the piece struck can be made to show the number of foot-pounds absorbed by it.

Fig. 1 gives the plot of the permanent lengths given to two plugs cut from a coppered Bessemer steel rod. Each was placed in an Olsen testing machine, loaded to the amount indicated, removed and calipered in length, replaced in the machine, loaded to the next higher amount, removed and calipered and so on to the largest loads indicated. The plugs were nominally ½-inch diameter by ½-inch long, but they departed from this somewhat. One was 0.5177-inch long by 0.500-inch diameter and the points for it are indicated on Fig. 1 by circles; the other was 0.5145-inch long by 0.498-inch diameter, indicated by crosses. The ordinates in Fig. 1 are expressed in decimals of the original length.

Curve A, Fig. 2, is the standard tween work and length. The work corresponding to each length was found by planimetering the areas, viz., in Fig. 1, the area between the axis of lengths, the curve, and the horizontal through 0.80 represents 145.4 foot-pounds. These are plotted in curve A, Fig. 2.

Curve A, Fig. 2, is the standard work curve for the ½-inch by ½-inch plug. Curve B, Fig. 2, shows the effects of the blows of a Bement-Miles 200-pound steam hammer under known amounts of kinetic energy. The hammer, piston and piston-rod weigh 195 pounds and the hammer can be raised to a height of 13.5 inches. Rods of lengths 6, 8, 10, 12.1 and 13.4 inches long, respectively, were used to support the hammer above the anvil. After carefully locating the plug on the center of the anvil, the support was knocked from under the hammer. In measuring the kinetic energy the

[1] Presented at the Chattanooga Meeting (May, 1906), of the American Society of Mechanical Engineers.

[2] Professor of Applied Mechanics, Lewis Institute, Chicago.

[3] Instructor in Forge Work and Machine Design, Lewis Institute, Chicago.

length of the plug after the blow was subtracted from the length of the rod. The cylinder was removed and the packing loosened during these tests.

All plugs were of Bessemer steel and, were annealed by heating to redness and allowing to cool in the air.

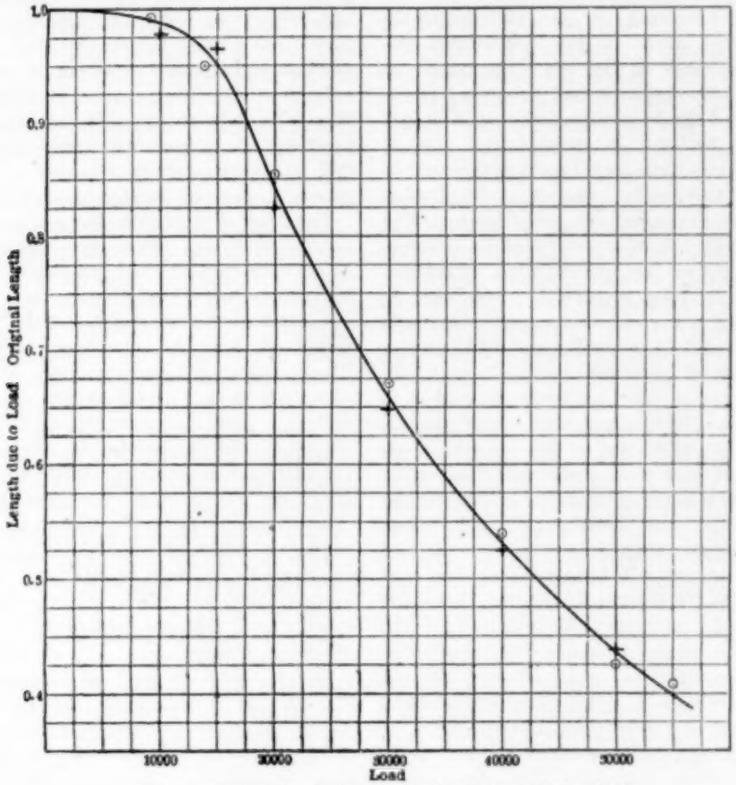

FIG. 1.—CURVE OF LENGTH OF COPPERED STEEL PLUGS.

In the testing machine the plugs were oiled with a thin film of light oil and compressed between hardened and ground steel plates. In the drop tests (without steam) the plugs were oiled. The anvil block had been newly dressed and was slightly rough from the tool.

The rebound of the hammer seemed negligible and no attempt was made to allow for it.

The annealing is a matter of importance, as is evident from the following, obtained in the testing machine on ½-inch by ½-inch plugs:

Change in length from

Unit length to	0.90	0.80	0.70	0.60	0.50	0.40
Work, annealed.	60.8	145.4	251.7	383.1	550.3	760.1
Work unannealed	66.2	156.4	262.9	404.3	570.9	787.1

On comparing the curve of the effects of the blows with the curve of work, it is apparent that a part of the energy is lost; in this particular case, between lengths 1.00 and 0.80, it requires about 1.45 units of kinetic energy to do 1.00 unit of work on the plug. This means a loss of effect in the blow of about 31 per cent.

Drop tests and work tests were made on ⅜-inch diameter by ⅜-inch plugs between the lengths 1.00 and 0.60 with a resulting loss of about 29 per cent.

Owing to the fact that the largest kinetic energy due to the drop of the hammer under gravity was only sufficient to change the length of the plugs from 1.00 to 0.80, curve B, Fig. 2, may not be reliable for reductions in length by a blow to less than about 0.75. To test the full effect under steam of the hammer mentioned above, at first three and then four plugs were put on the anvil together. In the former trial the aggregate effect of blow was 489 foot-pounds (taken from curve A), and the kinetic energy was 692 foot-pounds (from curve B). In the latter case the aggregate effect of the blow was 616 foot-pounds and the kinetic energy was 872 foot-pounds. Both blows were intended to be the heaviest blows of the hammer. It was decided to consider the difference in the strength of the blows as due to "accidental" causes. A reasonably certain "heaviest blow" could best be ascertained after several trials.

Each of two ½-inch by ½-inch plugs was given the full blow of the hammer. Curve A showed that one absorbed 675 and the other 705 foot-pounds with a mean for the two of 690 foot-pounds. In view of the difference it is assumed that each case is a measure of the actual energy absorbed from the blow, and that the total (mean) kinetic energy was about 690 x 1.45 or 1,000 foot-pounds, of which 320 foot-pounds were lost.

By the methods suggested, two important results can be accomplished for any particular hammer, viz.:

a. With a standard plug the effect of a blow can be measured.

b. With a standard plug and the kinetic energy of the hammer at the instant of the blow known the loss of energy can be found.

Further, it would seem that such standard plugs made of materials and dimensions to suit the size of hammer and to insure the absorption of the hammer energy without injury to the hammer and anvil blocks, would serve as the means of rating hammers for purposes of comparison and sale.

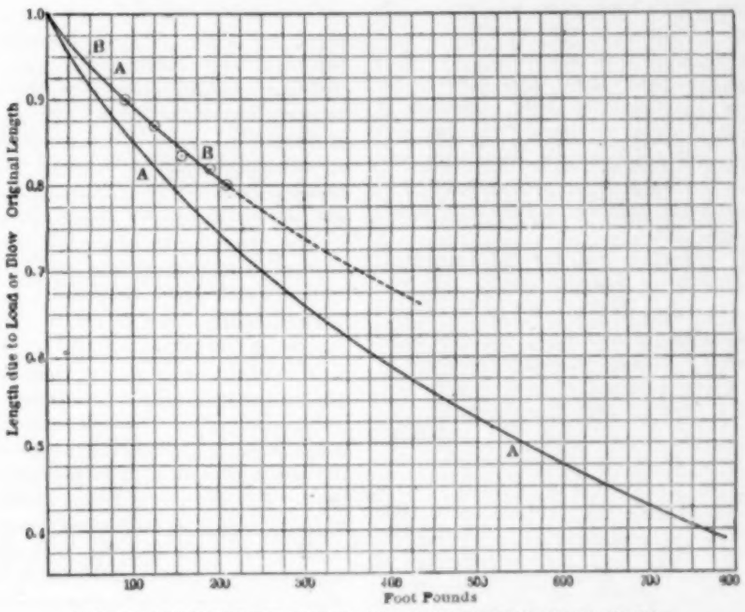

FIG. 2.—WORK-LENGTH CURVE, AND CURVE OF EFFECT OF BLOWS.

COKE AS A BLAST-FURNACE FUEL—ITS MANUFACTURE AND CHARACTERISTIC PROPERTIES.[1]

BY EDWARD A. UEHLING, M. E.

When bituminous coal is exposed to high temperature for a sufficient length of time all the volatile matter is driven off. This process is called dry distillation. If air or other sources of oxygen are excluded during the distillery period, there remains a more or less porous mass which contains all the fixed carbon and solid impurities of the coal. This residual mass is called coke. The physical and chemical qualities of the coke are principally conditioned on the nature of the coal, but in a large degree also on the apparatus and process employed in the manufacture.

Distillation of the coal is carried on commercially for two distinct purposes:

1. The manufacture of gas.

2. The manufacture of gasless fuel, viz. coke.

For the former purpose distillation is necessarily effected in retorts closed to the air. The resulting coke is a by-product. A part of this coke is always utilized in the process to furnish the heat required for distilling the coal. The remainder is either sold as fuel for all the various purposes to which it may be best suited or it may be consumed with greater profit in the production of water-gas; both processes being carried on side by side. The coke resulting in the manufacture of gas is known as gas-coke. Gas-coke being produced from coals selected for their gas qualities only, distilled in small charges, driving off the gas at a high rate and hence short-time exposure, results in a very spongy, frail mass quite unfit for a cupola or blast-furnace use.

1. Distilling coal for the purpose of producing an infusible strong, and gasless fuel was first carried on in meilers consisting of heaps of coal carefully piled up in approximately hemispherical form, covered with earth and provided with air and draught-ducts.

In the meiler heap, the necessary heat to drive off the volatile constituents of the coal was in large degree produced from the combustion of fixed carbon, in consequence reducing the yield. The gas was practically all wasted. From good coking-coal, nevertheless, by careful piling and attentive watching a very good quality of coke could be produced.

From the primitive method of coking in meiler heaps, the present form of the beehive coke oven was evolved by slow stages of improvement. The process of distillation being similar, the wastefulness of the former is inherent also in the latter, differing only in degree. The arched space over the coal, however, offers better opportunity for burning the gas, and the earth-covered arch of the oven-dome deflects more of the heat generated. It also absorbs heat and acts as a reservoir of the heat absorbed, which is partially utilized in starting the process of distillation and igniting the gas of the succeeding charge. Distillation proceeds from the top down. The necessary heat is produced by burning the gas as fast as liberated. Combustion is very imperfect. The air required for combustion enters through the partially closed oven door, and is regulated by the "coke burner" in charge of one or more batteries of ovens. This regulation, done according to judgment of the burner, is effected in a most primitime manner by removing or replacing a few brick-bats in the temporary wall which closes the oven-door. During the first half of the coking-process the gas comes off very copiously, and combustion is only partially effected in the oven. These products of distillation and combustion pass off through the tunnel-head in large volume, manifesting itself as a dull, smoky flame at night, and a dense black smoke in the day time, befouling the atmosphere over many square miles about, at all times.

Toward the end of the burn the gas comes off more and more scantily and becomes quite insufficient to protect the fixed carbon from oxygen of the air entering through the cracks of the ineffectively luted doors, even when conscientiously attended by the burner, so that in the best average practice ten per cent of the fixed carbon is consumed, and a deficiency in the possible yield of coke from twelve to fifteen per cent is not unusual.

The beehive oven, however, has two important points in its favor. First, it is cheaply built, and second, it produces an excellent coke from good coking-coal. The beehive coke has a bright silvery appearance, produced by the deposition of carbon derived from the hydrocarbons liberated from the bottom layers of coal toward the end of the burn; in passing through the crevices in the incandescent coke above, the heavier hydrocarbons are decomposed and the carbon deposits on the surface of the coke glaze the latter in the manner so characteristic to beehive coke. Since this glazing can take place only at a high temperature it becomes incidentally a sign of quality, and because its true cause for existing was not generally understood, it was universally believed to be the necessary and true sign of quality. This belief gave rise to the widespread prejudice against retort-oven or by-product coke which is of a dull, lustreless appearance, and the belief is still very largely held by many blast furnace men that good coke can be made only in the beehive oven. This prejudice is largely responsible for the opposition which the more economical, and in every respect superior, retort coke-oven has met in this country.

The idea of economy has so far not greatly worried either the great or small manufacturers of coke in America; many of them, I dare say, are not even aware of the fact that anything of account is being wasted. Those who may have some idea of the enormous waste going on are, nevertheless, quite contented. Coal is abundant; inexhaustible—in the present day and generation. If they think at all on the subject, the thought is "apres nous le deluge," and so long as there is plenty of coal and it can be cheaply mined, profits are good enough without going to the extra trouble and expense necessary to get all there is in it.

In the western half of continental Europe, where nature did not so abundantly deposit the better varieties of mineral-fuel and where the coal-measures are considerably more difficult of access, efforts to check waste going on in the coking process were made soon after its existence became known, and the demand for gasless fuel warranted the increased first cost. It was early realized, however, that the beehive oven was merely an improved meiler heap, the constitutional defects of which could not be entirely overcome, and that to prevent the consumption of fixed carbon it was imperative that it be carried on in a chamber or retort closed to the air.

The first practical application of the closed coking-chamber was made in 1855, by the Appolt brothers. Soon after this, the saving of tar and ammonia was begun on a commercial scale. Notable improvements were made by Knab, Carves, Hussner, Brunk, Hoffman, and many others, so that there are today several well-developed and thoroughly tested systems which have completely displaced the beehive oven in Germany, France and Belgium, and will do so in England and the United States as soon as the unfounded prejudices are overcome and its commercial advantages are fully understood and appreciated.

The most noticeable and far-reaching improvement in the coking process was introduced by G. Hoffman in 1884.

[1] Reprinted from the *Stevens Institute Indicator*.

This consisted in combining the Siemen's regenerative system with the retort coke-oven, resulting in marked economy in consumption of gas and increased regularity in the process of distillation. This process was taken in hand and systematically and energetically pushed by Dr. Otto, and the ovens so constructed are known as the Otto-Hoffman ovens.

The coke produced in the retort-ovens, generally called by-product coke, differs greatly from beehive coke in appearance; it breaks up into prisms more nearly cubical, and lacks entirely the bright, silvery lustre so characteristic of good beehive coke. When produced from the same coal it is denser, physically stronger, and chemically more stable than the beehive coke, and, therefore, a superior fuel for metallurgical purposes.

The qualities required of a blast-furnace fuel are best realized by following it through from the coke-oven to the hearth of the modern furnace and studying the functions it has to perform. Starting with the coke in the oven, it is subjected to at least two handlings to get it into cars for shipping, viz., discharging from the oven on the loading platform, where it is quenched with water, and dumping into the railroad car. In case of retort-coke this is done by machinery and in bulk. The beehive coke is quenched, pulled out and forked into the car by hand. The cars are shipped to the blast furnace, a distance varying from a few hundred yards to several hundred miles, having to bear many a shock and continued vibration en route. Having arrived at its destination, the coke is dumped from the car into the bin. From this it is drawn into a stock larry and from the larry it is discharged into the skip bucket in which it is hoisted to the top of the furnace and poured into the receiving hopper. From this it is dropped on the bell in the charging hopper, and from there into the furnace where it receives a final shock by having a heavy charge of ore and limestone dumped on top of it. To fulfill the requirements of a good blast-furnace fuel, it must withstand these ten or more maltreatments without undue crushing or abrasion.

The office of the coke in a blast furnace is two-fold: physical and chemical. Its physical office consists in maintaining a sufficiently open stratification in the material descending in the shaft of the furnace to permit the ascending gases to pass through without undue resistance. Its chemical function is to combine with the oxygen of the blast, and produce the reducing agent CO, and generate the heat necessary to smelt the iron and slag within the zone of fusion, and to maintain the temperature required to produce the chemical reactions in the zone of reduction and preparation, as the stock descends down the shaft of the furnace into the hearth.

To fulfill its physical function best, the coke must be coarse, but not in too large chunks, of irregular, angular shape, and practically free from breeze (coke dust). It must persist in its firmness of structure, i. e., it must maintain its shape until it reaches the tuyeres to be consumed by the blast. Its chemical office is most economically fulfilled when a maximum amount of the coke reaches the tuyeres where it is consumed by the oxygen of the blast, forming monoxide (CO), and generating the greatest heat where it is most needed. This heat melts the reduced iron and fuses the flux (lime, etc.) with the ash of the coke and the impurities of the ore into a liquid slag. The CO with the nitrogen of the air-blast passes upward heating the descending stock. In passing through, the carbon monoxide vigorously attacks the oxygen in combination with the iron, already partially reduced from the ore, and forms carbon dioxide (CO_2) and metallic iron. The CO_2, immediately it comes in contact with red-hot coke, is reduced to CO, which again attacks the ore taking away more oxygen. These reactions continue through the whole upward course of the gases, but less and less vigorously as the temperature is reduced by the cold descending charges, until the gases leave the furnace through the down takes. Many other reactions take place in a blast furnace which need not be considered here. It is most essential for fuel economy, as well as quality of product, that the greatest possible amount of the carbon in the coke should reach the tuyeres, and be consumed by the blast to produce heat and CO. Chemical stability, i. e., the property of withstanding the oxidizing action of CO_2, is therefore most important.

The oxidation of carbon by carbon dioxide ($CO_2 + C = 2CO$) is a heat-absorbing reaction, and the carbon thus carried away is therefore a double loss to the process of smelting. It is furthermore essential to rapid and economical work that the coke should burn quickly, and to do this it must offer a large surface to the blast. The greatest amount of cell space consistent with maximum strength, is therefore desirable. It must combine chemical stability with physical strength. From the above it is very evident that gas-coke is quite unfit for a blast-furnace fuel.

There are only two other fuels which can be used for the process of smelting in the blast furnace, viz., anthracite and charcoal. The latter is a superior fuel because of its chemical purity and cell structure, but it lacks physical strength and because of the increasing scarcity of timber is rapidly becoming too expensive to compete with coke. Anthracite, though chemically quite equal or even superior to coke, is deficient because of its lack of cell structure and is physically not adapted to produce the loose stratification necessary for rapid driving in large furnaces. It is only a question of time until both these fuels will cease to play an important part in the smelting of iron.

On the continent of Europe, the retort oven has entirely superseded the beehive oven, and for the following reasons:

1. Coals that produce a good coke in the beehive oven will produce a superior coke in the retort oven.

2. Many coals that cannot be coked successfully in the beehive oven will produce a coke of fair quality in the retort oven.

3. The same coals will yield from eight to ten per cent more coke in the retort than in the beehive oven.

4. The drawing is done mechanically with a considerable saving in cost.

5. The yield of by-products is a source of revenue which is always considerable, and may, under circumstances favorable to same, even rival the profit derived from the coke itself.

In this country and in England the retort coke still has a formidable rival in the beehive coke. The majority of the practical furnace men are as yet prejudiced against the former. This prejudice is due either to an entire lack of knowledge, or to knowledge gained by superficial investigation. Where knowledge is lacking, preconceived notions dominate. Superficial investigation generally leads to erroneous conclusions.

The prejudice against retort coke of those furnace men and furnace proprietors who either have not had the opportunity or have no inclination to investigate the question, is based on the aversion of the average furnace manager and founder to try something new; to experiment, as it were. "Everybody uses beehive coke. We know what it is, and we had better let good enough alone." There are others, not many let us hope, who have figured out to their own satisfaction that the coke made by the new process cannot be as good as the old-fashioned beehive coke, because so many valuable constituents in the form of by-products are abstracted from the coal, and the coke must therefore neces-

sarily be inferior. "The looks of the stuff gives it away." Those who have superficially investigated the matter for the purpose generally of fortifying their prejudices, have found many facts to sustain their preconceived conclusions.

The first retort ovens built in the United States were of poor design: not properly proportioned for the kind of coal to be coked; perhaps also carelessly built, and managed without proper understanding. A flat failure was the necessary result. But even in those plants which were properly designed, as well as carefully and intelligently managed, great difficulties had to be overcome in training green hands, and in getting matters working smoothly; more or less inferior coke resulting in the meantime. This, however, holds in a measure also in starting a plant of beehive ovens in a new locality. Moreover, the coal coked in the retort ovens is generally inferior in coking quality to the coal coked in the beehive oven against the coke of which the retort coke is tested. From the above it is easy to see how the prejudices against retort coke held, even among fair-minded and intelligent men, found nourishment and perhaps originated in real facts observed or communicated.

BARABOO DISTRICT DISAPPOINTING.

Marquette, Mich., May 25.—Fred Bartle, a Marquette range diamond drill man who has returned from the Baraboo district of Wisconsin, reports that practically all operations have been suspended there. During the five years that he had charge of the drill work for the Pittsburg Steel Co., the lands controlled by that corporation were given a thorough exploration. The results may be surmised, according to Bartle, when it is stated that not only have all drilling operations ceased, but it is understood that work was recently suspended in the last of the two mines located near Baraboo, a property which had been in continuous operation for more than five years. That the mine should shut down now, when there is such a great demand for all grades of ore, is taken to mean that the property is of little value. Drilling in the district, which a few years ago promised big things for that portion of the Badger state, had to be done to a depth of between 800 and 1,000 feet, through an overburden of very hard rock, to reach the ore measures. The workings of the developed properties were very wet and pumping charges unusually heavy.

NEWS FROM THE IRON RANGES.

The Consumers' Ore Co., controlled by the Cleveland firm of M. A. Hanna & Co., has taken over the Hollister mine, Menominee range, and is preparing to re-open the property. A plant of machinery, consisting of boilers, hoisting engine and air compressor, is being installed. The workings will be unwatered and the shaft retimbered and repaired to its present depth of 150 feet, after which it will be put down 450 feet more and from that level systematic exploratory operations will be started. The property lies about four miles east of Crystal Falls. It was opened in 1889 by S. D. Hollister, but after shipping a few hundred tons of ore it suspended operations. Later it was re-opened by Ishpeming parties, with Captain J. H. Cundy in charge, only to again become idle within a year or two, at a time of disastrous depression in the iron trade, and with a record of but 4,100 tons of ore shipped altogether it has since been out of commission. The mine was unwatered during the iron boom of 1899-1900 by Oglebay, Norton & Co., of Cleveland, but no mining and but little exploring was done and the option was permitted to lapse. It is not improbable that the Consumers' company will find large ore bodies at depth; in fact, diamond drill work done in the past has shown the existence of deposits beneath the present workings, and were it not for difficulties to be met with in the way of wet territory and difficult ground in which to sink, it is likely that the Hollister would even now be on the shipping list, it having been under option to a number of different concerns. The Consumers' company has taken the property under lease. Capt. Frank Scadden of Crystal Falls is superintendent in charge of the work.

Installing New Machinery.

The Mineral Mining Co., which in a way is subsidiary to the Pewabic Co., operating at Iron Mountain, is installing machinery at the old James property, in the Iron River district. It is likely, however, that the work of unwatering the shaft, which is down to a depth of 300 feet, will not be commenced until the middle of June or later. The erection of a new shafthouse has been completed. Louis Dober, of Iron River, on whose homestead was opened the Dober mine of the Steel Corporation, and who in the past has done considerable exploratory work, is again turning his attention in that direction. He has secured options to a number of desirable tracts, among them the A. C. Nash farm, four miles west of town, and will begin his operations at the latter location. Reports that the Steel Corporation's Riverton mine is about worked out and will shortly be abandoned, are again in circulation. However, stories to this effect have been floated in past years about this time, but the Riverton goes on mining and shipping ore just the same and will no doubt continue on the active list for some years to come. The Lake Erie Ore Co., the newly organized corporation which recently purchased the section 12 mine of the G. W. Youngs Mining Co., is controlled by members of the firm of Drake, Bartow & Co., former ore brokers at Cleveland. G. W. Youngs and his sons retain a one-tenth interest in the property.

Munro Has Resumed.

The Munro property at Norway, recently unwatered, has resumed operations for the season, and is again shipping ore to the Escanaba docks. Until different instructions are received, only one shift of sixty men will be employed. However, with the resumption at this mine, and at the Norway and Cyclops, and the steadily improving conditions and increase in output at the Aragon, Curry, West Vulcan and Saginaw, more prosperity is held out for the city this season than for several years past. At Pickands, Mather & Co.'s Vivian mine at Quinnesec, the night crew of about fifty men has been laid off and it is understood that only one shift will be worked during the remainder of the season. The allotment of ore the Vivian has been called on to produce is less than anticipated, and the output required can be mined without the necessity of work at night. The men whose services were dispensed with quickly secured employment at the Munro and other properties. Ramsdell & Bergeron of Norway, have commenced exploratory work on a tract north of Brier Hill upon which they have secured an option. A churn drill will be used. Some test-pitting has been done, and ore running 48 per cent in iron has been uncovered. The concentrating works of the Pewabic Mining Co. at Keel Ridge, are resuming operations after a six years' idleness, the starting of the plant having been delayed by the necessity of rebuilding the spur track from the main line of the Chicago & Northwestern road. H. G. Getzen has been appointed superintendent of the works, and Pietro Raffini is in charge of mining operations. The Winnifred Mining Co., a branch of the new Rhodes corporation, has options to the Alpha and Atlas properties in Mastodon township, near Crystal Falls, and will do

considerable work of an exploratory nature in that vicinity this season.

Fine Plant of Machinery.

What will be one of the finest plants of machinery on the Marquette range is being put in by the Cleveland Cliffs Iron Co. at its Cliffs Shafts mine at Ishpeming. The equipment consists of a double cylinder hoisting engine, with two ten-foot drums, and an air compressor of a capacity sufficient to furnish power to fifty drilling machines. Each of the new cages, with its equipment, will weigh five tons, and the cars will each carry two tons of ore. The new hoisting plant will result in a large saving of fuel, and with an increase of 25 per cent in the working force will permit the output of the mine to be doubled. These additional men will be taken on as soon as the new machinery goes into commision, at which time the Cliffs Shafts will have 500 names on its payroll. The present air compressor will be retained in place for use in emergencies. New boilers were installed at the mine during the winter, and the pumping system also was improved. Still another improvement has been the construction of an addition of 120 feet to the coal dock, which materially enlarges the storage capacity. The new hoisting plant is being installed at the B shaft. Pending the completion of the work, which will require about three weeks with three eight-hour shifts employed, the mine is being operated with the usual force of men, but all hoisting is being done through the A shaft, where a temporary engine has been put into commission at the crusher house.

Leak from Waterworks.

It has recently been discovered at Negaunee that the unusual influx of water at the steel corporation's Blue mine was due to a break in the city water main. The circumstances were peculiar. Several weeks ago, at the time of the spring freshets, the mine was forced to suspend operations for a few days because of an unexpected flow of water which had broken through into the shaft. This water did not flow in from the surface, and there was no way of changing its course. Apparently it had filtered down through the sandy sub-soil to the rock ledge, whence it found its way into the mine workings. It took several days to fork out the extra water, which had flooded the lower levels and drifts, and since that time an extra No. 10 Cameron pump has been required. A still hunt was instituted for the outlet to the supposed vug or spring, with the result that the break in the water main some distance away from the shaft was discovered. Water was found pouring from the break in large volume, a fact which is held responsible to a large extent for the poor showing made at the water works plant in the expected saving since the installation of meters. How long the break would have remained undiscovered had it not been for the trouble experienced at the Blue, it would be hard to estimate, as none of the water which escaped from the main found its way to surface, but instead had worked out a subterranean passage for itself.

Work at the Empire Property.

A force of forty men is now employed at the Empire property, which John T. Jones of Iron Mountain, is opening in the Cascade district, south of Negaunee. The work in hand consists of cross-cutting and drifting from the main shaft through the ore, so that everything will be in readiness for mining a large output as soon as shipping can be commenced. This will be within three weeks, or whenever the Chicago & Northwestern road finishes the construction of the spur track it is building into the property, and it is possible to get in the crusher plant and the larger hoisting machinery which will replace the present equipment. An auxiliary shaft or winze, eight feet square, into which the ore will be blasted when production starts in earnest, is now being sunk. Chutes will be placed beneath the winze, and through them the ore will be handled for hoisting to the surface, where it will be fed to the crushers as required. The company has decided to install an endless belt conveyor, on which the crushed ore will be carried to the cars. The force of miners now employed will be considerably increased as soon as shipping is started, and if no unforeseen delays occur in installing the crusher plant, a large tonnage will be secured by the milling system, which makes possible the removal of a much larger body of ore in a given time than any other method.

Ore Dock Delayed.

Work on the Chicago, Milwaukee & St. Paul railroad's new ore dock at North Escanaba has been vexatiously delayed by the slowness in arrival of timber. It was anticipated early in the spring that the big structure would be in readiness for use by the first of June, but it will doubtless be later than July 1 before the pier goes into commission. A second coal dock, of large capacity, is also to be built by the company. A site between the two ore docks has been selected. The piling will be driven this year, a contract for which has already been awarded, and the superstructure erected next summer. At its coal dock at Marquette, the Lake Superior & Ishpeming road, controlled jointly by the Cleveland Cliffs and Jones & Laughlin companies, has completed the construction of a 200-foot addition. The extension makes the dock double its former capacity, and when fully stocked will hold enough fuel to last the company through the winter months, between the closing and opening of navigation.

Exploring on Baraboo Range.

Capt. W. J. Trebilcock, who has been superintendent of the Mansfield mine in the Crystal Falls district of the Menominee range for the past year or two, has been transferred by the steel corporation to the Baraboo district of southern Wisconsin, where it is understood the big company will test the mineral possibilities of a number of different properties, using the diamond drill extensively in the work. This move of the steel corporation has been learned with general surprise. During the time of the rush for properties in the new field, the steel corporation held aloof, and it was considered that it had little confidence in the district. Now, however, after a number of different concerns have met with discouragement there, among them the Pittsburg Steel Co. which at least was recently reported as having quit work entirely in the Wisconsin territory, the giant corporation of them all quietly slips into the field and without a blare of trumpets begins the work of ascertaining for itself the possibilities of the region. Capt. Trebilcock left Crystal Falls for North Freedom with the expectation, it is said, of remaining there a considerable length of time, which is taken to indicate that the steel corporation's reported search for ore in merchantable quantity and quality will be thorough. He is succeeded at the Mansfield by John T. Mason, who has been in charge of operations at the Michigan.

Sunday Lake Improvements.

An important program of betterments is said to be carried out during the next two years at Pickands, Mather & Co.'s Sunday Lake and Brotherton mines, in the Sunday Lake district of the Gogebic range. Included in this is the sinking of a four-compartment shaft at the Brotherton, 8 x 24 feet in size and fitted with two skip-roads, one ladder way and a pump way. The shaft will be supported by steel setts and will be covered by a steel shaft house. It will go down at the rate of about 45 feet a month, it is expected, and it is figured that it will be in readiness to begin regular duty in about two years' time. Operations at the mine will be much facilitated by this new shaft, and by means of it much ore which is not now available will be brought to the surface. A new boiler house in which will be installed two large high pressure boilers is to be erected shortly, and in addition a new air compressor of a capacity to operate twenty drills will be doing duty within the course of a few weeks. At the Sunday Lake, a triplex pump of a capacity of 1,000 gallons a minute is to be added to the equipment. Combined, th

two mines last season shipped 215,000 tons of ore.

Will Ship a Million Tons.

The steel corporation's Monroe mine, a Mesabi range giant located in the Chisholm district, is expected to ship a million tons of ore this season. The property has the distinction of possessing the largest pump and the best electric system on the range, and in other respects it is excellently equipped for heavy and economical production, it having cost something like three-quarters of a million dollars to bring the mine to its present stage. Returns are just now beginning. Milling is in progress at B and C shafts, and from 6,500 to 7,000 tons of ore, or about 150 cars, are sent to the shipping docks daily. This product, with shaft A in commission, it will be possible to double next season. Stripping is in progress at the newer opening, with three steam shovels and a large force of men employed. The ore at the Monroe is of excellent grade, is easily mined and there is enough of it to assure the operation of the mine for a number of decades to come.

Unless present plans are changed, it is understood that no ore will be shipped from the Stephens mine of the steel corporation. However, the work of stripping is proceeding with three shovels engaged, and eventually a very heavy tonnage will be forwarded from the property. The mine sent out some ore last year, after being prepared during the preceding season for heavy production, and is now being developed on a much greater scale. The deposit at the Stephens is very large and the quality of the ore the best. The property is located north of Aurora. The company's big Burt mine, east of the Hull, is not expected to ship as heavily as last season, when more than three-quarters of a million tons were mined. This is because of the necessity of building a new approach to the big open cut, that in use last season having been left at a level too high for economical operations by reason of the extraction of the ore. Four large and powerful compound and triplex pumps, recently ordered by the company for use at different mines, are building at a Milwaukee works.

Wet as the Penobscot.

The Hobart, a new mine being opened by the Rhodes Mining Co., at Sparta, bids fair to make a record as a wet proposition that will rival the Penobscot, famous in that respect, in the Hibbing district. Two vertical shafts, 100 feet apart, are being sunk, and on acount of the large volume of water met with, the progress is very slow. At present there are six No. 9 Camerons and three Prescott sinkers engaged in keeping the water from drowning out the shafts. The pumps have a minute, and are being operated to the limit. Despite the obstacles to overcome, however, before the ore body is reached, it is understood that a considerable tonnage will be forwarded from the mine this season. At the Brunt, which the Rhodes company also is opening, much better progress is making. Water is causing no trouble; in fact, the mine is comparatively dry, and pumping costs are consequently at the minimum. A vertical shaft 8 x 18 feet in dimensions, is going down. It is expected to make a shipment of 100,000 tons this season.

The Leonard mine at Chisholm and the Lincoln at Virginia have been added to the season's shipping list, at the latter property a 4,000-foot spur track to D shaft having recently been completed by the Missabe road. At the Genoa mine, the Iron Range road is extending a spur to No. 3 shaft, sunk last winter. In order to obtain sufficient room here for the storage of ore cars, it will be necessary to extend the track over the old cave-in above No. 2 shaft, to accomplish which considerable filling will be done. Ground for this purpose is being taken from the site of the new stock-pile ground.

Hibbing is the most recent town on the Mesabi to be invaded by the Western Federation of Miners, a branch of the union having just been organized there. All told, the organization has been sucessful in securing a considerable membership on the range, and it is now announced that a newspaper is to be established. The publication will, it is said, be printed in three languages, English, Austrian and Finnish.

It is expected that this season the Republic Iron & Steel Co. will double its output of last year, when about 300,000 tons measured the outgo. The bulk of the 6,000 tons will come from the Mesabi, the remainder from the Negaunee field of the Marquette range. The Kinney, which has been stripped for open cut mining, will be the company's largest producer.

The Pitt Mining Co. has added two 65-ton locomotives and a 70-ton steam shovel to its equipment. The new machines will be used at the Wacoutah mine.

The Drake & Stratton stripping company is now employing more than 1,200 men, in addition to its steam shovels, on the Mesabi range, and expects to move 9,000,000 yards of earth during the year.

Notwithstanding the political troubles through which Russia passed in 1905, the production of coal in that country showed only a slight decline from 1904. The metal industries were likewise not affected to any great extent.

ECONOMICAL LUBRICATION OF LARGE PLANTS.[1]

BY WILLIAM M. DAVIS.[2]

In the lubrication of a large plant, the first consideration is, of course, efficiency, then economy; although some engineers seem to think that it is impossible to attain the first and at the same time give any consideration to the latter.

To obtain efficient lubrication, the first thing to do is to see that the lubricants used are of good quality, either choosing well known or tested brands, or specifying what they shall be composed of and the test that they shall conform to. Next is to see that suitable and reliable appliances are used to feed the oils, that crankpins, eccentrics, bearings, etc., be provided with center oilers, telescope oilers, sight-feed cups or other devices, so that every drop of oil that is fed from the cups will go directly to the bearing surface, without any being thrown or spattered over the engines or machinery.

For slow-speed engines, ordinary sight-feed cups, properly looked after, will give satisfactory results, but for heavy high-speed work the continuous oiling system with the oil flowing from an overhead tank to the bearings, in streams if necessary, thence through a filter and back to the overhead tank, is the most efficient method of lubrication. From an economic standpoint, the success of such a system will depend entirely upon the means provided to catch the oil after it leaves the bearings.

With slow-speed engines, and, in fact, with all machinery that uses oil in quantities, every bearing on which oil is used should be provided with substantial sheet-steel pans, arranged, if possible, to drain the oil to some central point, into a bucket or tank, from which it can be taken to the filter. When the crank case is enclosed, care should be taken to keep the oil as free from water as possible, as water will sometimes travel along the piston rod into the crank case, and, if it is the least bit alkaline, from compounds used in the boilers, the oil and water together will sometimes form a compound which is hard to separate, and which lowers the quality of the oil.

On slow-running engines where the pressure is not excessive and on some slow-running shafting, a good grade of grease or tallow compound will often give good results, but where the compression cups are used the grease should be quite soft, so that it will spread freely. If too hard, great pressure will be required to feed it, and it will also tend to increase the friction load.

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[1] A paper presented at the Pittsburg (May 1906) meeting of the Ohio Society of Mechanical, Electrical, and Steam Engineers.

[2] Oil Inspector, American Sheet and Tin Plate Co.

With large engines, it is sometimes the case that the hub of the flywheel or a large gear wheel is fitted so close to the bearing that there is not sufficient space to fasten oil pans under the bearing, and all excess of oil will be lost. Such bearings can often be lubricated economically by packing a lump of medium hard grease down on the journal, at each end of the bearing, and feeding a little oil in the middle. The grease will prevent the oil from running out too fast and at the same time help to lubricate.

In regard to cylinder lubrication, no one can make any hard and fast rule as to the proper amount of cylinder oil that should be used; that will have to be determined by test and experiment. First, a good quality of oil should be provided. Second, to get economical results, make the conditions as favorable as possible. See that the steam is dry; do not carry the water in the boilers too high; do not use an excess of strong alkaline boiler compound and, above all, do not set the piston rings out too tight. Before putting the rings in the piston, chamfer the edges off slightly with a file. If the edges are sharp they will tend to scrape the oil off the surfaces.

From the lubricator the discharge pipe should extend into the center of the steam pipe, so that the oil will drop off into the current of steam. Where the engine speed is constant there is little choice between a force-feed pump and an ordinary sight-feed lubricator. Either will give efficient and economical service, if properly taken care of; but where the work is intermittent, the engine stopping and starting, as is the case with mining engines, tug-boats, etc., the force-feed pump is the more economical.

To determine the proper amount of cylinder oil to use in any particular engine, first have the conditions as favorable as possible. Then gradually reduce the oil feed and note the action of the valves. If they work smoothly, it is a good indication that the cylinder is all right; but if they commence to groan, increase the oil feed slightly. In this way the minimum amount of oil that should be fed can be determined very closely. After this, the cylinder head should be removed and the surface of the cylinder examined. If it looks oily and, when wiped over with a piece of soft paper, a stain is left on the paper, it is certain that enough oil has been fed.

Another important matter in economical lubrication is in the receiving, handling and proper distribution of the lubricants. If the plant is a large one, the oil house should be provided with storage tanks of sufficient size to hold a tank car of each kind of oil. By purchasing the oil in tank cars there is a reduction in the price per gallon and a saving in the labor of handling of the oil and the empty barrels. In a small plant where only a few barrels of each kind of oil are used a month, tanks holding from two to ten barrels should be provided, so arranged that the oil can flow by gravity from the barrels into the tanks. Care should be taken to see that the barrels drain out clean.

As the empty barrels are each worth from 50 cents to a dollar, they are worth saving, and should be piled up in a cool, dry place until a sufficient number have been accumulated to make a carload. Before being loaded into the car for shipment back to the works, the hoops should be driven up tight, so that there will be no danger of their coming apart and the barrels falling to pieces. The credit for the empties is based on their condition on arrival at the barreling station, and the amount paid is quite an item in reducing the lubricating cost.

It is customary in a large plant to have in charge of the oil house a man who receives and stores all the lubricants, issues them and charges them up to the various departments, keeping the record in a book or on suitable blank forms. There are two methods for limiting the daily amount of lubricants for each department. One is for the chief engineer or master mechanic, when making his daily rounds, to give each engineer an order for his day's supply of oil and grease. In this way he knows if the amounts required are increasing or decreasing. Another way is to make up an allowance sheet showing the amount that each engine room or department can have per day or week, with the proviso that if, for any reason, it is necessary to have more than the regular allowance, a written order must be presented to the man in charge of the oil house or the storekeeper.

In a small plant the storekeeper often has charge of the oil house, opening it for half an hour in the forenoon and half an hour in the afternoon, so that those who need lubricants can come or send for them during these times. At the end of the month the storekeeper totals up the amounts of lubricants used in each department and engine room on special blank forms, and these amounts, when multiplied by the price per gallon or pound, will show the total cost for lubricants for the month. By this means it will be shown if the cost is increasing or decreasing in any particular department.

It has been found to be an excellent plan to give the engineers and heads of departments a copy showing not only their own consumption and costs, but the cost of the other engine rooms. This tends to establish a rivalry among the men, each trying to improve his practice and reduce the cost. It also tends to prevent them from wasting their supplies.

TENNESSEE-REPUBLIC PLANS

Include the Repurchase of a Railroad.—Activity in the South.

(Special Correspondence.)

Birmingham, Ala., May 26.—By purchasing back its old railroad property, now known as the Birmingham Southern railway, the Tennessee Coal, Iron & Railroad Co. (merged with the Republic Iron & Steel Co.) will be able to operate plants and manufacture both iron and steel and the finished product on a cheaper scale besides producing a larger tonnage. The deal is on for the purchase of this railroad property and all indications are that the purchase will be consummated. The Louisville & Nashville and Southern railway jointly purchased the property several years ago, when Nat Baxter was president of the Tennessee Coal, Iron & Railroad Co., paying something like a million dollars for it. The Birmingham Southern railway was formed and Jones G. Moore was elected to the presidency. When John A. Topping, president of the Republic company and chairman of the board of directors of the Tennessee company, took charge of affairs and began his investigation into conditions in this section, he discovered that a mistake had been made in parting with the railroad property, and that if it could be bought back, it would be a great move. Negotiations were taken up at once and it is believed that the transfer will take place June 1 or a month later. It is believed that, once more in possession of this property, the Republic-Tennessee company will make additions which will connect all properties and give the corporations transportation facilities that cannot be furnished by foreign concerns. More than a million and a half dollars will change hands in these deals.

Many changes are being announced from day to day by the officials of the Republic-Tennessee company as the alignment of the concentrated company takes place. The announcements as to the proposed development are looked for daily.

The Tennessee Coal, Iron & Railroad Co. is operating the two open-hearth steel furnaces in the little mill on the site of the Birmingham rolling mills, (Republic company) and upwards of one hundred tons of steel are being made daily. This steel is being used in the rolling mills and at Ensley in the manufacture of rails. These furnaces were the first to accomplish on a commercial basis the manufacture of open-hearth steel in this district.

The announcement of the resignation of J. A. Durfee, as general superintendent of the Ensley steel and iron manufacturing division for the Tennessee Coal, Iron & Railroad Co. during the past week was quite a surprise. Mr. Durfee came

to this district from the Colorado Fuel & Iron Co. He is practical and has good command. Through his efforts the mills at Ensley were improved and output on all sides increased. He will return to the Colorado company.

Early in June the Republic Iron & Steel Co. will blow in the furnace at Thomas, near here, which has been undergoing repairs for the past ninety days. This will make all three furnaces of the company at Thomas in operation. The Sloss-Sheffield Steel & Iron Co. will blow in its city furnace the last of the coming week.

The Southern Steel Co. is rushing improvements and repairs on its blast iron furnace at Gadsden. It is stated that orders have been placed for additional plants to be erected adjacent to the steel mills at Gadsden. More than a million and a half dollars will be expended by the Southern Steel Co. in its proposed plants around Gadsden. The Alabama Consolidated Coal & Iron Co. is having considerable good fortune in its production of basic iron at its Gadsden furnace. The new furnace of the company at Gadsden will shortly be ready for operation.

Alabama cast iron manufacturers are selling their product in great quantity. The order for five thousand tons accepted recently by the Dimmick Pipe Co., the product to be shipped to New Orleans during the balance of the year, is but part of the business in sight to be handled during the remaining months of the year. Good prices have obtained all along for cast iron pipe and the manufacturers have laid in their probable need in pig iron for the next four months at least.

No statement has been made looking to any shut down of rolling mills in this district during the summer. The shipments of finished iron and steel are equal to the production right along.

There is not any curtailment in production at the steel rail mills at Ensley, and there will be none for two years at least. There is no end of orders in hand and in sight for this product.

The plant of the American Cast Iron Pipe Co., at North Birmingham, is now in operation and the first shipment of pipe was made a few days since. The plant will shortly be on in full blast. It is understood that there is a good demand for the product of this company and that a long steady run is assured.

Official announcement is made of the sale of between 150,000 and 200,000 tons of steel rails by the Tennessee Coal, Iron & Railroad Co. for delivery during 1907. Of this amount 65,000 tons were sold in the last two weeks. The greater portion of the buying has been done by the Louisville & Nashville railroad, the Southern railway and the Illinois Central railroad.

WAITING FOR 'FRISCO.

ENGLAND EXPECTING ORDERS FROM AMERICAN CITY.

Iron Trade Still Dull.—Serious Labor Troubles Feared.—Staffordshire Iron and Steel Institute.

(Special Correspondence.)

Birmingham, England, May 14.—The iron trade has not yet recovered from the languor which set in about two months ago. Prices have steadily tended downwards, and practically every description both of pig iron and finished iron is cheaper than it was a fortnight ago. Pig dealers have never failed to preach optimism, and to expatiate on the bulk of their order books, but this did not prevent them, when they found a few people on Thursday last prepared to buy, scrambling for their orders. They were all ready to make concessions, and Northampton changed hands at £2 10s 0d, Derbyshire selling at £2 12s 6d. Finished iron is materially weaker, and many works are running short time. The sheet trade is especially depressing, and there is very keen bidding for orders. The Strip Association is to meet on Thursday, and this is generally understood to mean an impending fall of half a sovereign a ton. With steel the case is different. Everybody is full of work and rumors of coming orders from San Francisco are keeping steel-makers on the qui vive. It is assumed here that America is too busy to supply the material, and that in view of freight charges, steel can be better sent from Europe than from the American steel centers. As far as this country is concerned, matters have not gone beyond the region of rumor. German houses are authoritatively reported to have had enquiries relating to from 10,000 to 20,000-ton lots, and one large shipping firm in London has been applied to to charter four or five steamers for 'Frisco requirements, but not a single order seems yet to have reached this country. Some of the northern houses are looking very sharply after the business, and such establishments as Dorman Long & Co. of Middlesborough are very well equipped for the supply of steel girders and other building material. Midland manufacturers are not at all sanguine that this district will benefit.

Waited on Gladstone.

Mr. Ebenezer Parkes M. P., the chairman of the Unmarked Bar Association, and one of our best known iron masters with Mr. J. S. Taylor of the firm of Taylor & Challen, Ltd., iron-founders, and the chairman of the Birmingham Chamber of Commerce, were members of a deputation, headed by Mr. Chamberlain, who a few days ago waited on Mr. Herbert Gladstone, the home secretary, with regard to the workmen's compensation bill. Mr. Parkes who very well represents the attitude of distrust maintained by many ironmasters towards the government, expressed the fear that the widening of the scope of the bill would bring in a lot of trivial accidents, and so lead to the rejection from employment of all old men. A great many manufacturers do not hesitate to attribute the serious check in trade activity to the industrial attitude of the new government.

Big Strike Threatened.

We have been fairly free from labor troubles during the trade revival, but an extensive lock-out of ship yard workers is now threatened. Three weeks ago, Messrs. D. W. Henderson, Meadow Side, Partick, on the Clyde, declined to dismiss a timekeeper objected to by the men, and the riveters with their apprentices came out on strike. The Employers' Federation is taking the matter up, and threatens to call on all firms connected therewith to lock out members of the Boiler Makers' Society. A further strike of 40,000 men is threatened, unless weekly pays are substituted for fortnightly, and both these matters are to be considered this week at a meeting to be held at Edinborough. The spirit of disaffection seems to be rapidly spreading, and this week a thousand workers in the ship building yard of Messrs. Beardmore & Co., Dalmuir, have struck work.

About sixty tin plate mills have stopped in South Wales, as the result of trade depression and the higher price of tin. Those still at work are operating on day-to-day contracts. The trade seems to be in a bad way, but it is hoped the depression will be temporary.

Iron and Steel Institute.

A fairly cheerful state of affairs was reported at the annual meeting of the Staffordshire Iron and Steel Institute, held at Dudley. The membership totals 286, representing an increase of nine on a year and there was a balance in hand of £126. Mr. Walter Somers, the head of Walter Somers, Ltd., the well known makers of big driving shafts, was elected president for the year, and Mr. R. Buchanan, the president of the Foundrymen's Association, was chosen vice chairman. The toast of the "Iron, Steel and Coal Trades" was responded to by Mr. George Hatton, the general manager of Lord Dudley's Round Oak iron works. Mr. Hatton, said that South Staffordshire continued to turn out excellent material which the world could not do without, and outside competition had failed to take from them the manufacture of cold blast pig iron.

Whilst the cold rolled sheet iron trade had practically gone to other districts, they had to send to South Staffordshire for their rolls. Some industries had gone, but such trades as chain, nut and bolt, tube and other hardware trades had grown up under the wing of the old industry.

Local iron masters may be said to have been assisting in the cultivation of a German *entente cordiale*. Col. Patchett, Mr. E. Parkes, M. P., and other prominent manufacturers taking part in a dinner at the Birmingham University in honor of a body of German economists and trade unionists who have come to this country to study economics, with special reference to conciliation and arbitration. Col. Patchett described the way in which the Midland Iron & Steel Wages Board, of which he is a prominent member, is administered, and Mr. Parkes testified to the great success of conciliation in the iron and steel trade. All the speeches overflowed with international good feeling.

A Large Fortune.

The fortune has just been proved of Mr. Samuel Loveridge, a well known Wolverhampton iron founder. It amounts to £615,892 gross and £564,383 net. With the exception of a few charitable gifts all the fortune goes to members of his family. Mr. Loveridge was the head of Messrs. T. C. Clarke, Horseley Fields, an iron-founding firm of world-wide reputation, and he was also director of the Wellingborough Iron Co. and was interested in several other concerns. It is understood that most of his large fortune was accumulated in the palmy days of the iron trade many years ago.

THE HAWLEY AUTOMATIC TRAVELING GRATE.

The accompanying illustrations show the Hawley automatic traveling grate, one of the newer forms of mechanical chain grate stokers. The main frame of the grate is built up of steel I-beams and other structural shapes, giving a structure composed of members of a great strength and stiffness with a minimum of weight. Connections between the various members are made with simple fastenings, permitting the erection of the grate without the employment of expert workmen.

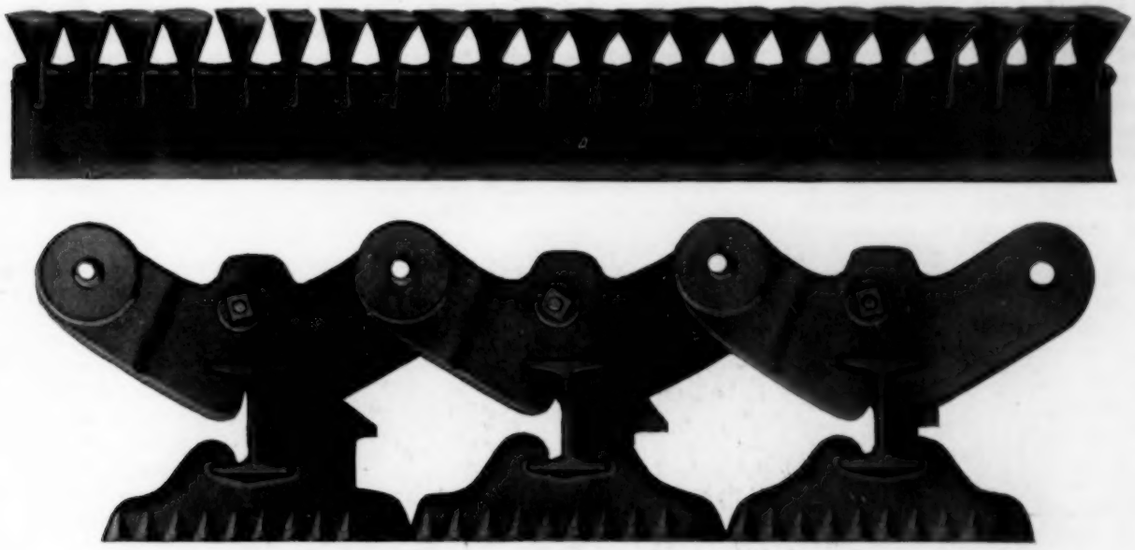

FIG. 1.—COMPONENT PARTS OF HAWLEY TRAVELING GRATE.

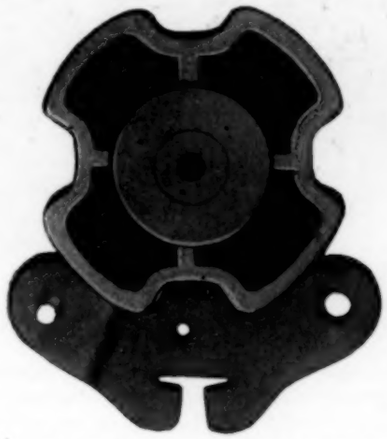

FIG. 2.—SPROCKET OF HAWLEY TRAVELING GRATE.

The grate proper is composed of small, independent cast iron parts loosely fitted over the flanges of I-beams, as shown in the lower view of Fig. 1. A number of these cast iron parts are strung along the I-beams, as shown in the upper view, Fig. 1. The lower flange of the I-beam at each end is fastened to the chain proper, which runs over the head and tail sprocket wheels. This chain is fitted with small wheels which bear on the main frame and carry the grate and its load not only on the top or working side, but also on the return. It is best illustrated in Fig. 3, which is the side view of the grate after withdrawing it from the furnace. The use of these wheels enables the grate to move easier and renders the driving very simple. The driving mechanism consists simply of one set of gears and a chain and sprocket.

A feature of the form of fastening of the grate bars is their independence of one another. Being independent and simple in design, expansion has no effect upon them. In case of accidents, a broken bar or several bars can be replaced without stopping or slowing the grate at any time. The broken bar may be removed and the others slipped along the I-beam to fill the gap, a new one being placed on the end. Each I-beam which carries a grate bar can be removed and replaced in the same manner, while the grate is passing over the sprocket wheel at the front end of the furnace.

The shaft of the grate is fitted with four plates or dampers, so arranged that the compartments formed catch such clinker and ash as fall through when the grate turns over the rear sprocket, and subsequently deposit them in the ash pit. These dampers, at the same time, restrict the flow of air over the rear of the grate. The coal hopper is equipped with a feed gate, composed of a steel beam or channel and fire brick. It is easily

operated and enables the fireman to vary the thickness of his fire at any time without stopping the grate or emptying the hopper.

The normal air space of the grate is between 30 and 40 per cent. It can, however, be altered to suit any special requirements, such as the burning of any kind of small bituminous coal, cheap screenings, as well as the high priced nut coals. The maker states that the furnace will easily carry continuous overload and be practically smokeless.

BOOK REVIEWS.

"Valve Gears for Steam Engines" by Cecil H. Peabody, New York, John Wiley & Sons. 142 pages with 32 plates. 6 x 9 inches. Cloth. Supplied by THE IRON TRADE REVIEW for $2.50.

This is the second edition of this well known work on valve gears. The book is intended for the use of engineering students, giving instruction in the theory and practice of valve gear design for steam engines. The author states that he has not attempted to give an exhaustive treatment of the subject, but rather to enable the learner to obtain a firm grasp of the principles involved and some facility in their application.

Many types of valve gears are discussed, and each type is illustrated by one or more examples selected from good practice. Graphic methods are used throughout the body of the book, both for demonstration of principles and for design of gears.

An appendix contains analytical descriptions of certain principles which cannot be treated in a complete and satisfactory method by graphics alone. The author uses the Zeuner valve diagram throughout the work.

The book is divided into six chapters dealing, respectively, with the plain side valve, shifting eccentrics, link motions, radial valve gears, double valve gears and drop cut-off valve gears. The appendix, as heretofore stated, contains mathematical discussions and will probably be passed over by the average reader.

A very commendable feature of the book is the arrangement of illustrations. These are omitted entirely from the body of the work, and are gathered together in a set of 32 insert plates at the back of the book. The inner portion of the plate is blank, so that when it is unfolded, the entire illustration is outside the page, enabling the reader to refer to it without any turning of pages. This is an idea that might be well copied in many other text books.

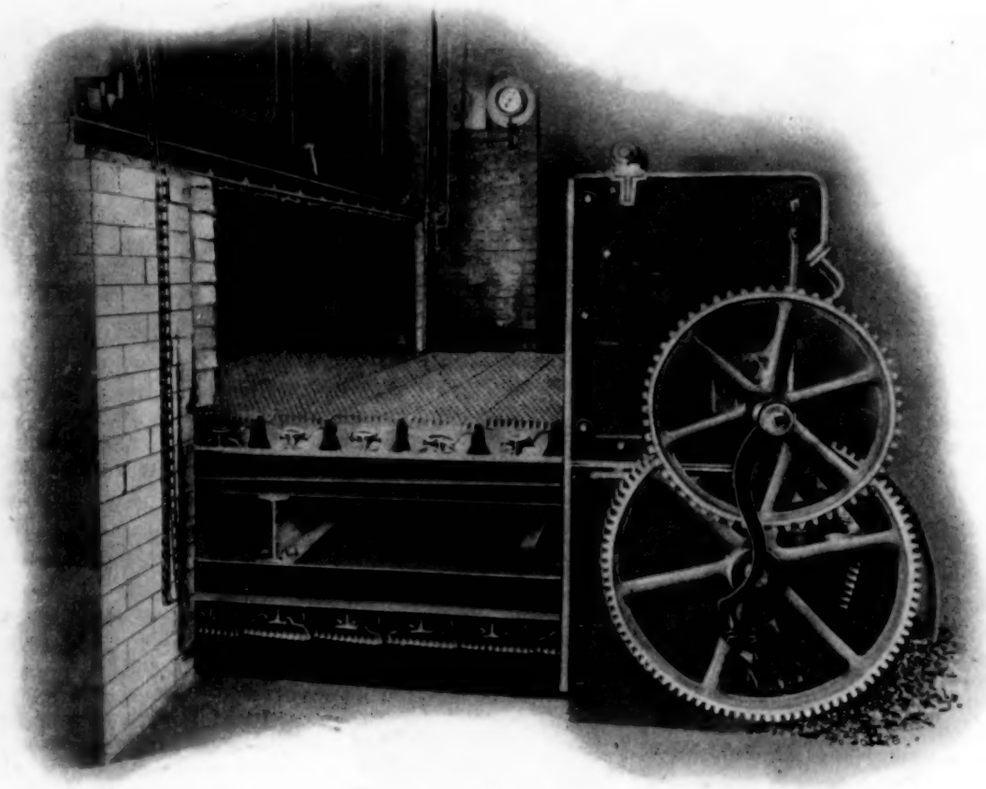

FIG. 3.—HAWLEY TRAVELING GRATE WITHDRAWN FROM FURNACE.

Machinery Imports at Kobe, Japan.—Consul-General Miller, of Yokohama, Japan, transmits a report from a Japanese newspaper concerning the phenominal progress made in the manufacturing industries of the Empire. The increased imports during 1905 at Kobe, through which port machinery is imported for the industrial centers in and about Osaka, is stated by the newspaper to be astonishing, the total amounting to $5,059,000, over three times the value imported in 1904. Of all machines, lathe machines made the highest increase, amounting to $1,240,000 in round figures. Next follow machines for metal and wood work, spinning and electric-light plant, locomotives and electric motors.

"Physics," by Charles Riborg Mann and George Ransom Twiss. Chicago. Scott, Foresman & Co. 5¼ x 7¾ inches. 453 pages. 237 illustrations. Cloth. Supplied by THE IRON TRADE REVIEW for $1.25.

The general dissatisfaction with existing works on physics is stated by the authors in their preface as follows:

"During the past few years it has become clear that the present methods of instruction in physics have failed to arouse in the students that real en-

thusiasm for the pursuit of the subject, which is indispensable for the mastery of its principles."

"President G. Stanley Hall comments at length on the decline of interest in physics in the high schools, and consequently also in the colleges, and he suggests several remedies. He attributes this failure of physics to 'the violence done to the nature and needs of the youthful soul by the present methods and matters.'"

The authors say they have endeavored to strengthen the presentation of the subject and aid the teacher in three ways:

"1. By arousing interest. 2. By developing the scientific habit of thought. 3. By presenting some of the principles from the historical standpoint."

And the particular method by which the authors endeavor to overcome the defects of the existing books is expressed in the following extract:

"The aim has been to show the student that knowledge of physics enables him to answer many of the questions over which he has puzzled long in vain. He is approached with the attitude: What do the forces of nature do for us, and how do they do it? His self-activity is stimulated by this questioning attitude of text-book and teacher, and he is urged to investigate independently at home. His interest is not killed at the start by attempting to cram him with definitions of things to which he has not corresponding concept, such as indestructibility, impenetrability, and the like. Nor is he deceived by attempted definitions of undefinable concepts, such as mass, force, time, and space. On the contrary, the attempt is made to implant the concept and create the demand for its name, or definition, which is withheld until the need for it is apparent."

The above statement leads us to expect a highly original style of treatment of the subject and in this we are not disappointed. For 100 years or more, writers on mechanics have treated mass, force, time and space as being practically fundamental conceptions of the human mind and capable of being expressed in definitions clearly comprehensible to a boy twelve years of age, and formerly it was not at all difficult to give a boy conceptions of such things as indestructibility, impenetrability, and the like.

Another peculiarity of the treatment of this book is that, as stated in the preface, "many of the old and familiar landmarks of the elementary physics text books do not appear in its pages. Among these may be mentioned the division of levers into classes; the wedge; the classification of equilibrium as stable, unstable and neutral. The problems also are an innovation; they include no cases of forces a, b, c, meeting at a point q, etc., but are as far as possible real concrete cases. The illustrations also are a novelty. Great pains have been taken to have every picture the photograph of a real thing and we think a photograph is always more interesting than a wood cut."

The authors hope that members of the teaching fraternity will regard the result of their work as an approximation. In the reviewer's opinion the work is an approximation which comes, especially in the treatment of mechanics, a long way from the object aimed at.

Chapter 1 treats of motion, velocity and acceleration, and instead of starting with some simple problem, such as Newton's apple falling to the ground, they say: "Let us suppose that a locomotive stands with steam up ready to make a run to the next station," and most of this chapter, and the second, which treats of mass and energy, deals with this locomotive and its train of cars. It is difficult to see how any clear conception of fundamental ideas of mechanics can be put into the head of a young student by beginning with such a complex apparatus as a locomotive and train.

They derive the idea of mass from the pull required to give the same acceleration to different trains or to trains of different numbers of cars, empty and loaded, and instead of a definition of mass they expound it in these words: "This difference in the make-up of trains, whether in the number of cars or in loads, is a difference in mass."

In order to arrive at the idea of force, the book begins with the acceleration of the train. It speaks of the engine using its full power, imparting to the train a certain acceleration. By the word "power," tractive force apparently is meant, for later in the page it says "observation and experience lead us historically to associate a greater acceleration with a greater effort or force;" and force is not defined in the old fashioned way as a push or a pull, but as a product of motion and acceleration. It is not until the 32nd page that the standard of mass is defined as a kilogram. Before that the empty car has been taken as a unit of mass.

The authors define weight rigidly as the attraction between the earth and any particular body, in this particular being in harmony with that of most modern writers, but they ignore the general definition of weight which is measurement of a quantity of matter. They cannot avoid using this definition, however, when they discuss practical problems such as that of the weight which is used to operate a clock. They say: "Suppose the weight has a mass of 5,000 grams" and "when the weight advances it does work in running the clock."

Throughout the early chapters where the locomotive and train are discussed the metric system and the centimeter-gram-second system is used exclusively. The speed of the train is given in centimeters per second, the unit of work is the dyne and the unit of energy is the erg. If the object of the authors is to make the study of physics easy, it would have been better to use feet and pounds as the units.

Power is denoted as the quotient of ergs divided by seconds and the word "activity" is frequently used as a synonym of power, as in the expression "The engineer's unit for power or activity in the horsepower." The introduction of this new word "activity" certainly does not tend to make the study of mechanics any easier.

The attempt to simplify the subject by introducing photographs of such things as locomotives and automobiles in motion, scenes representing ploughing, haying and diving, etc., is not entirely successful. Photographs are not nearly so good illustrations of the simpler phenomena of mechanics as clear line drawings. On the whole we think this book on physics as far as the chapters relating to mechanics are concerned is distinctly inferior to earlier works on the subject.

The subject of heat is treated of in the old fashioned way except that here and there the authors inject their peculiar style of asking questions instead of making direct statements. For instance, instead of stating that bodies in general expand when they are heated, they say, "Do solids and liquids expand when they are heated and contract when they are cold? Everybody knows that they do." "Does water always boil at the same temperature and what is the nature of the phenomenon we call boiling? In order to find answer to these questions consider first a glass fruit jar of water exposed to the air. If the jar is placed in a warm room, what will happen to the water?"

The chapter on electricity is excellent. The statement of the history of the development of electrical knowledge is most interesting and well expressed. Only here and there does the peculiar style of the authors interrupt the progress of the thought, such as the following: "We may now ask, is it likely that the substance with which we rub the glass or wax suffers no

change of condition? Ought we not to suspect it also received a charge? And will the charge, if it has one, be of the same kind as that of the substance rubbed, or of the opposite kind?"

The chapter on magnetism is also excellent and the same may be said of the remainder of the book covering induced currents, the electric current at work, wave motion, sound, light, etc.

The last chapter of the book is a brief one on electrons. It mentions Crooke's vacuum tubes, Cathode rays and radio-activity, etc., but contains rather more of Thompson's theory of electrons, than of the actual experimental facts of radio-activity.

If the first five chapters of the book, relating to mechanics, could be thrown away and the old fashioned treatment of fifty years ago substituted, the book, we think, would be a very good one and would compare favorably with any of the recent works.

Extensive Improvements.—The W. P. Davis Machine Co., manufacturer of machine tools, engines, boilers, etc., Rochester, N. Y., is making a number of extensive improvements. The store building now under way will be 40 x 160 feet, four stories, with a basement. It will be of mill construction, and will be equipped with a sprinkler system, including a tank to be erected as a tower. The machine shop proper will have a frontage of 140 feet and extend back to the tracks of the N. Y. C. & H. Railroad, which are elevated through the city. The company owns the right of way under the tracks. The machine shop is connected through a subway with a building on the opposite side of the track and directly over the gorge of the Genesee river. This building, 40 x 88 feet, is three stories in height; the first floor being used for a grinding room, the second for the storage of machinery, and the third for pattern room and pattern storage. The engine room is 30 x 32 feet, a fire-proof building of two stories which will be moderately equipped. The machine shop will be a one story building of steel frame work with brick walls. It will have a bay, with a traveling crane with a span of 36 feet and a capacity of 10 tons, from which machines can be taken from the floor and loaded directly onto the cars in the rear of the shop. This will be equipped with all modern apparatus. A feature of the plant is the fact that the side of the store which is 160 feet long faces the passenger tracks of the New York Cenral, and that the second floor, which is on the level with the tracks, will have show windows from which machinery can be seen by passengers on this line.

BOUNTIES DISCUSSED

In the Canadian Parliament.—Tariff Changes Announced.

(Special Correspondence.)

Toronto, Can., May 24.—The resolution introduced in the Canadian parliament at Ottawa by James Conmee declaring in favor of the continuance of the bounties on iron and steel, when produced from Canadian ore, and of the remission of the duty on coal imported for coking to be used for smelting purposes, was debated at length on May 21. In speaking of the resolution Mr. Conmee stated that Canadian furnaces were using American and foreign ores, because in the payment of bounties no preference was given to the metal produced from Canadian ores. He recognized that it was not desirable that the change should be made violently, and would have the bounty on metal produced from American or other foreign ore expire gradually, according to a sliding scale, and the bounty on the domestic product continued. Alexander Johnston of Cape Breton, pointed out that the iron industry of Nova Scotia depended on Newfoundland ore, and urged that the remissions of the coal duty would work serious injustice to Nova Scotia coal mines. Mr. Macpherson spoke for the coal interests of British Columbia in opposition to the removal of the duty on coal. Hon. Wm. Paterson, minister of customs, questioned whether the steel industry would have grown to its present extent if the bounty had been restricted to the product of Canadian ores. It would be disastrous to existing industries should Mr. Conmee's proposal take effect immediately. Mr. Conmee said that as the object he had in view had been attained by the matter being brought up for discussion, he would withdraw the resolution.

Hon. W. S. Fielding, finance minister of Canada, made his annual financial statement,—usually called according to English traditions—the "Budget speech," on May 22. He announced that, as the proposed general revision of the tariff would not be made this session, only a few minor changes would now be made, merely to confirm existing conditions. The following were the changes announced as affecting the iron industry: The exemptions from the duty on machinery, of beet sugar machinery and machinery used for alluvial gold mining which expire shortly, to be extended for six months, or till Dec. 31. Old rails which are sent out of Canada to be rerolled, to be brought back subject to a payment only of 25 per cent on the value of the labor employed in the United States, provided that such arrangement shall not continue longer than the establishment of any mill equipped for doing this work in Canada. A refund of duty equivalent to this reduction in the case of re-rolled rails has already been granted to the Grand Trunk railway and the rule is now made generally applicable.

As regards tariff revision the finance minister said that the government hoped to bring froward a revised tariff at the November session "unless there were delays in the present session to cause a change in the program." He intimated that the revision would not make any great changes, but would meet such new conditions as had arisen and hoped that its adoption would be followed by a period of tariff stability.

The executive council of the Canadian Manufacturers' Association protested against the admission of supplies for the Intercolonial railway, owned by the government, free of duty from the United States. A special clause in the tariff permits this in the case of a government railroad and the Manufacturers' association asks that this clause be rescinded and the Intercolonial placed on the same basis as the National Transcontinental, which must procure all supplies in Canada as far as possible.

The National Transcontinental (Grand Trunk Pacific) Railway Commissioners have called for tenders for 65,000 gross tons of 80-pounds steel rails and the necessary fastenings. Tenders will be received up to June 7.

J. H. Plummer, president of the Dominion Iron & Steel Co., who recently returned from Europe has gone to Sydney, N. S., to inspect the plant.

Bog iron has been discovered in Oakley township, about ten miles from Bracebridge, in Muskoka district, Ont. Iron ore was discovered last fall in this locality by J. B. Brown, John Anticknop and Louis Pettetier. Subsequently it was subjected to tests proving it to yield 55 per cent iron high in quality. M. P. Mackay, manager of the Muskoka Foundry Co. works at Bracebridge, pronounced the product of some of the ore which was smelted there to be the best foundry iron. It is purely a surface deposit extending, so far as known, over an area of about 900 acres, and is at least five feet in depth. The finders have secured mining rights covering the deposit. The transportation difficulty at present existing will be overcome by the building of the Bracebridge & Trading Lake railway.

The Central Foundry, Ltd., head office, Toronto, capital $200,000, provisional directors, Henry L. Bowers, Hiram T. Bush and Robert C. Donald, has been incorporated.

NEWS FROM MANY INDUSTRIES.

New Buyers:—

George D. Todd of Louisville, Ky., has purchased the plant and grounds of the Louisville Bolt & Iron Works and will organize a company with a capitalization of $50,000 for the operation of the bolt department. Associated with him will be Harry B. Pyne and George Holzbog of Jeffersonville.

Stockholders of the United States Hoe & Tool Co., Columbus, O., have voted an increase in capitalization from $150,000 to $200,000. Extensive additions to the plant will be made at once.

Cincinnati and Hamilton, O., interests have incorporated a $500,000 company for the erection of a large blast furnace at the latter place. The incorporators are J. P. Thomas, W. M. Trevor, and W. W. Ramsay of Cincinnati, and J. C. Hooven and George P. Sohngen of Hamilton.

The Cook-Lewis Fdy. Co., Greensboro, Tenn., has been incorporated with a capitalization of $25,000 to take over and operate the plant of W. B. Cook & Co. of that city.

The Cincinnati Metallic Window Screen Co., Cincinnati, O., has been incorporated for $10,000 by Louis H. Schwerer, Frank Nunning Jr., Frank Nunning, Robert J. Hobing and Ed. Hobing.

The Convertible Folding Machine Co., Sandusky, O., has been incorporated with a capital of $10,000 by A. J. Peters, Geo. A. Blackford, Martha Linder, F. E. Alvord and A. G. Bier.

The A. D. White Machinery Co., Chicago, has been incorporated for $20,000 by Andrew D. White, Frederick R. Sargent and Marcus Hitch.

The Federal Steel Castings Co., Chester, Pa., has been organized with a capitalization of $500,000. It takes over the plant of the Delaware River Steel Castings Co., which it will extend and operate.

The Flexible Tire Co., Inc., Springfield, Mass., has been formed by William G. Marr of that city, and a number of associates to manufacture a steel automobile tire invented by Mr. Marr. He will act as president of the company, which has a capitalization of $60,000.

The Donaghmore Iron & Steel Co., Lebanon, Pa., was recently organized to deal in iron and steel products.

The South Bend Supply Co., South Bend, Ind., was recently organized by F. W. Long, C. H. Dunfee and A. N. Long to deal in machinists' tools.

The Marion Iron & Brass Bed Co., Marion, Ind., has been incorporated with a capitalization of $150,000 by George C. Harwood, Charles G. Barley and Seneca W. Winder.

New Construction:—

The Lockhart Iron & Steel Co., McKee's Rocks, near Pittsburg, manufacturers of high grade iron and steel bars, will increase its capacity by adding six new puddling and heating furnaces and two new bar mills, together with the required additional engine capacity. The plant, when the new features are added, will consist of 45 puddling furnaces, three bar mills, a muck mill and a guide mill.

The American Bridge Co. has a contract for the structural steel work to be used in the mammoth plant of the Great Southern Lumber Co., at Sheridan, La. This contract calls for between 8,000 and 10,000 tons of structural steel to be used in the construction of a saw mill 122 x 280 feet, a planing mill 125 x 450 feet, a lath mill, power house and a timber dock 175 x 300 feet and a sorting dock 300 x 400 feet, together with the various platforms and stagings which will connect the different buildings. A dock in front of the dry kilns will be 160 x 500 feet, and a dock for dry dock sorting will be 250 x 500 feet. In addition to this there will be steel sheds over many of the docks and outside machines, as well as sheds and docks for dressed lumber and the loading dock. The Great Southern Lumber Co., which is one of the enterprises of the Goodyears of Buffalo, has about 600,000 acres of native forest in Louisiana, and the contract for the buildings is one of the largest ever placed by any company in the lumber business. All machinery, including travelers from one building to another, will be built by Filer & Stowell, of Milwaukee.

The erection of another furnace at Jackson, O., for the manufacture of high silicon irons from the native ores of that district, is being considered. The Jackson-Muncie Coal Co., which owns a considerable tract of coal land adjacent to ore deposits, is said to be interested in the project.

The Wallace Machine & Fdy. Co., Lafayette, Ind., is erecting a new brick building 47 x 107 feet to be used as a fabricating shop in connection with the structural steel business of the company. An overhead track system has been put in place, and other equipment purchased.

The Kemmerer Iron & Steel Co., Scranton, Pa., has let the contract for its new rolling mill to Spruks Bros. of that city. The building is to be 120 x 265 feet, and the work of construction will be rushed.

The Ballard Drop Forge Co., Ballard, Wash., is increasing its plant, equipping it with considerable machinery of the company's own make.

Contracts for the erection of the Great Northern shops at Devil's Lake, N. D., have been let. The cost will be about $160,000.

Machinery is being installed in a part of the shops of the Detroit, Toledo & Ironton at Jackson, O., and they will be in partial operation within a short time. Labor trouble has interfered considerably with construction work.

The Central Foundry Co., Webb City, Mo., which now has one of the largest cupolas in the state, is enlarging its plant and will almost double the capacity of the foundry, which is devoted exclusively to the manufacture of ore crushing machinery.

The Jasper County Foundry of Carterville, Mo., has bought the J. H. McKenna plant at Joplin, which has been idle for six months, and is now operating both plants at full capacity. Edward McDonald is manager of both plants.

The I. & E. Greenwald Co., Cincinnati, has increased its capital stock from $200,000 to $500,000, of which $200,000 is in six per cent preferred stock, and $300,000 is common. Large extensions are contemplated.

The Steel Foundry Co., Cincinnati, is ready to begin operations by blowing in one 15-ton acid furnace. A 15-ton basic furnace will be started by Aug. 1, and work on the completion of the plant will be rushed during the summer.

The Bickford Drill Co., Cincinnati, has begun additions to its present plant, which will increase its floor space about 50 per cent. A new power plant, doubling its present capacity, will be installed.

Fires:—

The plant of the Henry Mfg. Co., Los Angeles, Cal., was entirely destroyed and the buildings of the Enterprise Machine Works and the Los Angeles Pattern Shop were heavily damaged by fire May 18. The total loss is placed at $25,000.

The wheel foundry of the Dickson Car Wheel Works, Dickson, near Houston, Tex., was destroyed by fire May 20. Only a few months ago the same foundry was destroyed and the rebuilding of the plant had just been completed.

Fire completely destroyed the plant of the Lloyd Boiler & Machine Works, Lufkin, Tex., May 18, the loss being $6,000.

The plant of the Kiesel Fire Brick Co., at Rochester, N. H., was destroyed with all its equipment except the small office building and the company's books on May 20. The loss is $12,000, partly covered by insurance.

The Conway Iron Works at Conway, N. Y., was destroyed on May 18. The loss is about $5,000, while the insurance was only $1,000.

General Industrial Notes:—

The Fort Pitt Malleable Iron Co., Pittsburg, Pa., is the name under which the Fort Pitt Malleable & Grey Iron Co. is now operating, as the manufacture of gray iron castings has been discontinued by this company.

The Keystone furnace of the Reading Iron Co., Reading, Pa., has been blown out for repairs after a campaign of two years.

The Southern Railway Co. has purchased the old Trigg ship yard property at Richmond, Va., for the extension of its track and warehouse facilities. The consideration is about $100,000.

The Eagle Foundry Co., Muncie, Ind., has arranged to occupy a portion of the plant of the Indiana Bridge Co., which will enable it to increase its force. Brass and iron castings are manufactured.

The Timpson Mfg. Co., Timpson, Tex., which was recently organized to manufacture the Reed cotton planter, has decided to add an iron foundry to its plant, catering to the jobbing trade.

The Rogers Conklin Mfg. Co., of Joplin, Mo., has gone out of the supply business, and will confine itself in future to strictly foundry work.

It has been reported from time to time that the two stacks of the Old Kentucky furnace at Paducah, Ky., would be started up soon, but this seems to be unfounded, as the owners are now hauling ore away from the plant.

Trade Notes:—

The Modern Steel Structural Co., Waukesha, Wis., has been awarded the contract for furnishing and erecting about 2,900 tons of structural steel required for the new stock house of the Schlitz Brewing Co., Milwaukee, the estimated cost of which is about $640,000.

The Canadian Westinghouse Co., Ltd., reports a large businesss in steam turbo-generator equipments. The Northern Electric & Mfg. Co., Montreal, recently duplicated an order for 300 k. w., Westinghouse-Parsons turbo-generator unit, to be installed in its powerhouse alongside of one of the same capacity now in service. The present turbine is operating part of the year condensing and through the winter non-condensing, the exhaust steam being used during the winter for heating purposes.

The Crocker-Wheeler Co., Ampere, N. J., recently shipped direct to San Francisco, a carload of its celebrated form L motors, ranging in outputs from one-quarter to three horsepower, to be used in the rebuilding of San Francisco. The company is now building the fourth, or last, of the 4,000 K. W. alternators ordered by the California Gas & Electric Corporation.

The Northern Engineering Works, Detroit, Mich., has installed a 12-ton Northern traveling crane in the plant of the Toledo & Chicago Construction Co., Kendallsville, Ind.

The American Locomotive Co. has received an order for 54 locomotives for delivery to Japan. The delivery on the order will begin in October and continue over five months.

The Westinghouse Machine Co., East Pittsburg, Pa., has booked an order from the Portsmouth Street Railway & Lighting Co. for a 500 K. W. turbine for installation in the plant at Portsmouth, O. The turbine is to be of the multiple expansion parallel flow type, direct connected to a 500 K. W. 60-cycle, two-phase 220-volt Westinghouse generator. Two 400 K. W. Westinghouse-Parsons turbines are already supplying Portsmouth with light and power. Steam turbines of this sort have recently been installed by the Durham Traction Co., Durham, N. C., and the Columbia Electric Street Railway Co., Columbia, S. C.

Ryland's Directory.—The ninth edition of Ryland's Directory of colliery, iron, steel, tinplate, engineering and other plants has been issued by the publisher, Eagland & Co., Ltd., London. The new edition has some additional features which add much to this valuable publication. It is not only a full directory of the United Kingdom, but claims to present accurate and up-to-date lists of plants in all the other leading industrial nations in the world. Hitherto Ryland's Directory has confined itself to enumerating the collieries and works of the United Kingdom alone. The compilation of the new lists for other countries, has, it is needless to say, involved a large amount of labor. The indexes are elaborate, but in the case of the United States we note that in the general index the only reference under United States is to the steel corporation, while in the cases of other countries a number of references are given. This prominence, doubtless unintentional, would hardly be desired by the corporation or be agreeable to its competitors. The list of finished iron works contains all the brands of finished iron now being made, together with the postal addresses of the works and the railroad passenger stations. The foreign lists are a complete directory of the pig iron, steel and puddled iron makers and rolling mills of the world. The number of blast furnaces and puddling furnaces at each works is given, and in the case of steel works, the number and capacity of the furnaces and converters. The machinery section is a directory in itself.

TRADE PUBLICATIONS.

The Rockwell Engineering Co., 26 Cortland street, New York, is distributing literature illustrating its products. This includes three pamphlets describing, respectively, the Rockwell brazing furnaces for oil or gas fuel, the Rockwell oil burners and the Rockwell double-chamber melting furnace. The brazing furnaces illustrated are a tube furnace, an open furnace, a bench brazing forge and a wire brazing furnace. A number of types of oil burners are described in the second pamphlet. Among them may be mentioned a high pressure burner, a low pressure burner and a combination high and low pressure burner. A melting furnace, described in the third pamphlet is for oil or gas fuel, and is adapted to melting copper, brass, bronze, aluminum, iron, steel, etc. In the pamphlet is incorporated the records of some tests of this type of furnace.

Frederick B. Stevens, Detroit, Mich., in catalog No. 6, describes a very comprehensive line of foundry supplies. The catalog is 6 x 9 inches, and comprises 225 pages. The material listed includes foundry supplies, fire brick, coke, foundry facings, brushes, sifters, shovels, crucibles, flasks, core ovens, patternmakers' letters, ladles, wheel-barrows, cupola blocks, molding tools, grinding and polishing wheels, tumblers and in fact, everything likely to be used about a foundry.

The Owen Machine Tool Co., Springfield, Ohio, is distributing catalog B. This catalog describes an extensive line of milling machines including the universal, duplex hand and plain milling machines of various sizes. It also lists a number of attachments for the milling machine, including rack cutting attachments, circular attachments, vises, chucks, indexing heads, feed boxes, oil pumps, vertical spindle attachments, etc.

The National Malleable Castings Co., Cleveland, has issued a handsome pamphlet descriptive of its exhibit at the Louisiana Purchase exposition. This included the National radial draft gear, malleable iron castings, Tower and Climax couplers, the National brake jaws, the National safety car door fastener, the National journal box. The pamphlet is a handsome publication, well printed and splendidly illustrated.

The Williams Electric Machine Co., Akron, O., is distributing a catalog describing the Williams friction clutch. This clutch operates by means of three Harding steel balls, which mount an incline, and force the interleaved friction discs into engagement. The clutch takes up a small space, and is accurately balanced. It will not disengage at high speed, but will slip under overload without damage.